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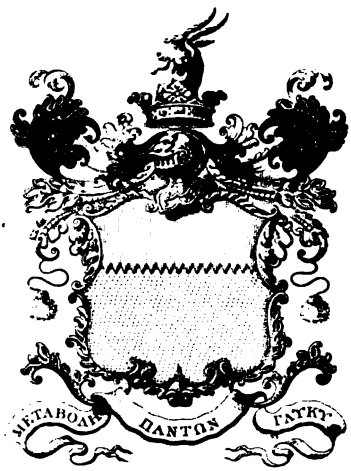

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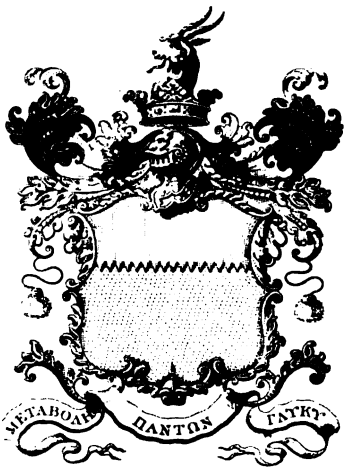

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PUBLISHED BY THE

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OF

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Giacomo Tommasini, *late Professor of Clinical Medicine in the University of Bologna, and Member of the Societa Italiana; Parma.*

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CASES

OF

SPASMODIC DISEASE

ACCOMPANYING

AFFECTIONS OF THE PERICARDIUM.

By RICHARD BRIGHT, M.D. F.R.S.

PRESIDENT OF THE SOCIETY,

PHYSICIAN EXTRAORDINARY TO THE QUEEN, ETC.

READ NOVEMBER 13TH, 1838.

The cases to which I shall now take the liberty of calling the attention of the Society are, in some respects, sufficiently interesting. They are three in number, and have occurred to me in the course of practice within a short time; two of them within the present year, and the third somewhat earlier. They are cases which differ very essentially from each other; yet all unite in illustrating, in a striking manner, a particular point with regard to the symptoms of disease, which cannot be indifferent either to the physician or the surgeon. The symptoms to which I refer are essentially spasmodic, and depend, as I conceive, on irritation communicated to the system from lesions within the chest.

All the cases will be found to agree in the great extent to which certain portions of the nervous system were involved, the irritation of which might, in

two of them at least, be looked upon as the cause of death; and in the third bore no small part in the exhaustion of the patient. In each of the cases the pericardium was importantly implicated, and there was reason to think that the phrenic nerve was the more immediate means of communicating the irritation to the spinal cord.

The nervous affection has been in each case of a spasmodic character, but has presented such a variety of aspects as, on that account, to afford interesting matter for reflection. In one case it was *chorea;* in a second it was *trismus*, terminating in *epileptic convulsion;* and in a third case, modified by the sex of the patient, it assumed more the appearance of *hysteria.*

CASE I.

The first case which I will relate is one to which I was summoned in consultation with Mr. Girdwood, and our late lamented fellow, Dr. Sims, on the 5th of April 1836. It was the case of a young man, seventeen years of age, who, about twelve days previously, had begun to complain of general rheumatic symptoms; pains in the limbs, with puffiness and swelling of the wrists, and some other joints, but the symptoms were not strictly those of acute inflammatory rheumatism. When all this was rather subsiding, about six days before I was called, peculiar spasmodic symptoms were said to have arisen, which had increased up to the time at which I first

saw him, when I found him labouring under the most fully marked symptoms of severe chorea, except that the convulsion was more violent than is almost ever seen in chorea. His head was constantly thrown from one side of the bed to the other. His lips were closed, and opened with a smacking sound, and when desired to put out his tongue it was protruded with all the forced grimace and difficulty observed in chorea. The pulse was weak, and varied from 108 to 120, and there was an occasional sharpness followed by a feebleness and a variation in the beat, which induced us to pay attention to the action of the heart, but led to suspicions, rather than conviction, of that organ being more than functionally implicated in the disease; for we found in the excessive convulsion of the whole muscular system, sufficient to account for a great deal of the disturbance which there was in the circulation, and in the heart's action in particular.

For two or three days our remedies appeared to alleviate his symptoms, so that for a day or two it was not considered necessary to meet in consultation; but the relief was very temporary. The chorea became more severe, and the spasms put on the character of the most violent convulsions. There was likewise some wandering of mind, his apparent incoherence being however certainly increased by the convulsions and contortions of his mouth, which rendered his utterance difficult and his words indistinct. His condition after this became such that some degree of personal restraint was absolutely ne-

cessary, and I found that this had been adopted when I renewed my visit. The swellings at the wrist and on one hand again increased; he grew worse; and on the 15th, being about the sixteenth day after the first spasmodic symptoms, he died.

The body was examined on the following day, when we found the heart, pericardium, and contiguous parts of the lungs, almost exclusively the seat of disease. The heart was adhering to the free pericardium, by the most profuse effusion of firm semitransparent gelatinous fibrin. This was particularly the case about the base of the heart, while towards the apex the effusion was rather an opake serum. The substance of the heart was red, and the semilunar and mitral valves had each a fringe of vegetations, doubtless rather recent, forming a raised irregular line along the auricular side of the mitral, and along the aortal side of the semilunar valve. The lining membrane of the membranous portion of the auricle seemed to have a thin false membrane upon it. The edges of the lung which lay on the pericardium were slightly adherent to that membrane by inflammation. The brain and the abdominal viscera were most carefully and minutely examined, and all found perfectly healthy.

CASE II.

I was requested by Mr. Balderson, on the 6th of June 1838, at 11 o'clock at night, to see a gentleman under the following circumstances:—

It appeared that on the first of the month, after some imprudent exposure to cold, he was seized with pain in the right side, and swelling apparently rheumatic of several of the joints. He did not, however, send for medical assistance till the 5th, the day before I saw him, when Mr. Balderson being called, found him labouring under severe pain of the right side passing upwards to the shoulder, with a full pulse. He immediately bled him freely from the arm, and the blood was moderately buffed. The following morning venesection was repeated, on account of the continued difficulty of breathing, and the inability to lie down in bed; but the shortness of breathing seemed to increase, the pulse became quick and irregular, and often indistinct, and he complained towards the evening that he had a difficulty in swallowing. When I saw him first at 11 o'clock at night, this last symptom was so distressing, accompanied with so much difficulty in opening the mouth, that I was led to inquire very particularly, whether he had received any prick or wound which might be producing tetanus, spasm, or trismus, but I could discover nothing except a blow and cut received nearly six months before over his left eyebrow, but which had healed without difficulty, or subsequent ill consequences. I saw him swallow, although with much effort, and with a kind of convulsive catch. I found his heart running on very fast, and acting spasmodically, but could discover neither rubbing sound, nor any bruit. He had no cough, and at that time I detected no pneumonic

crepitation in the lungs; the skin perspired very freely.

Considering all the symptoms, I could only come to the conclusion, that it was a case where rheumatic inflammation had affected the diaphragm, and probably the pericardium; and as the two bleedings had afforded no relief, and the pulse was rapid and faultering, and a blister was already applied to the pit of the stomach, it was agreed to give the combination of calomel, antimony, and opium, every two hours, or every four, according to circumstances, to apply mustard poultices freely to the chest, and to open the bowels, which had been confined for some days, by purgative draughts.

About 2 A.M. Mr. Balderson was called up to see him, on account of the rapid increase of the tetanic symptoms, and found that he had only been able to take one pill and one of the purgative draughts, and now his teeth were completely closed. At 9 A.M. I again saw him, and found him propped up in bed. The anxiety of countenance was excessive; the state of trismus was complete; so that it was impossible to to get anything into his mouth, and his deglutition so completely interrupted that he was unable to swallow his saliva, and it was with the greatest difficulty he could get rid of it as it collected in his mouth. There were likewise some slight indications of opisthotonos and spasmodic action of the muscles of the back. His bowels had been twice relieved; his pulse was very rapid, often quite indistinct. We ascertained distinctly that there was some pleuritic

effusion, with a rubbing sound, and likewise some pneumonic crepitation at the lowest part of the left lung; but from the distressed state of the patient, and the difficulty of examining the right side in the position in which he lay, I did not think it right to trouble him further; more particularly as the state of his pulse and his skin appeared at the time to prohibit further depletion.

A blister was ordered to the nape of the neck, and the blistered surface on the chest to be dressed with mercurial ointment; a dram of the stronger mercurial ointment was also to be rubbed in every hour on the thighs; a suppository of three grains of opium to be introduced into the rectum; and if at any time the relaxation of the spasm would permit, he was to take pills of calomel, tartarized antimony, and opium, as before ordered.

At half-past 2 o'clock P.M. I again saw him. Every thing had been done most strictly as was ordered, but there had been no relaxation of the spasm, and within the last two hours he had experienced two severe convulsive seizures, and another came on while I was present. It was quite epileptic in its character, and the countenance became purple and suffused—the eyes strained—the whole body convulsed. His pulse was very feeble, and his skin bathed in a most profuse perspiration. He was quite aware of his situation, though he rambled occasionally. He suffered three more distinct epileptic attacks, and died at 5 o'clock P.M., within twenty hours of the first appearance of the symp-

toms of dysphagia, on which the trismus and convulsions had rapidly followed.

Sectio cadaveris, fifteen hours after death.—The lungs were somewhat gorged with blood, but were quite crepitant and pervaded by air, except a small flap of the lower lobe of the right lung, where it rested on the diaphragm and a still smaller portion of the lower lobe of the left lung. In the edge of the right lung there was a small portion, which broke down easily under pressure. The lower half of the right pleura, as it covers the ribs and extends over the whole diaphragm, was highly inflamed, and covered with a thin coating of fibrin. The inflammation was, however, still more marked as it ran up towards the root of the lung and covered the right side of the pericardium, where the phrenic nerve was seen winding its way down the membrane in the midst of the most intense indications of inflammation, and as it ran over the diaphram was covered with shreds of recent false membrane. The left pleura was also inflamed, and a chamber was formed at the lower part just where the diaphragm forms an angle, containing about half an ounce of straw-coloured serum intersected by bridles of recent lymph. We discovered no other morbid appearance. The head and spine were not examined.

The two cases which I have now related are full of matter for interesting consideration, and in a practical point of view afford examples of the combination of inflammatory affections with convulsive symptoms, capable of masking each other in a man-

ner which it is most important to bear in mind. In the former of these cases the inflammation of the pericardium was but darkly conjectured even to the last. In the latter case the inflammation of the pleura and diaphragm was much more early predicated, and yet the obscure story of a cut upon the forehead six months before had its weight on our minds in a case so exactly resembling traumatic trismus, and probably in some degree paralysed the desire for more large depletion; from which, however, I do not believe any benefit would have resulted, considering the complete relaxation of the pores of the skin, and the state of prostration to which the pulse was already reduced by the two previous bleedings. At the same time, when we find on examination the results of intense inflammatory action, it is not possible to feel confident that bleeding, even in the very advanced stages, might not have been serviceable. Had the state of the patient been such as to permit of the regular administration of medicine by the mouth, I have great confidence in the effect which calomel, antimony, and opium would have produced; and this combination is, perhaps, a more appropriate remedy than large bleeding under such circumstances; but whatever the remedy we may feel inclined to adopt to overcome the disease, the great and important point is to impress upon our minds the fact, that the most violent attacks of spasmodic disease will occasionally owe their existence to inflammation of that portion of the pleura and the pericardium, where inflammation is often with diffi-

culty detected—that part more particularly where the phrenic nerve in its course or its distribution is to be found.

I have still under my care a lad whom I admitted into the hospital five weeks ago, with rheumatism slightly affecting the joints, but more materially the muscles of the chest. His whole aspect was so strikingly that of trismus, that I greatly suspected that this disease was coming on. The peculiar knitting of the brows, and, above all, the complete drawing down of the angles of the mouth when an attempt was made to protrude the tongue, (which could be done but imperfectly,) led me to this fear; but under the free use of calomel, antimony, and opium, he has become completely convalescent, and is taking the sulphate of quinine, and walking about the ward; but still there is great irritability of the heart.

With regard to the connexion between chorea and inflammation of the pericardium, when called upon the year before last to deliver the Lumleian Lectures at the College of Physicians, I took occasion to state, that for some years I had been persuaded of the existence of such a combination, and little attention has hitherto, as far as I know, been paid to the subject, although the combination of this spasmodic disease with rheumatism has been long recognized. In the very excellent "Syllabus, or Outlines of Lectures on the Practice of Medicine," published at Guy's Hospital, I find, in the edition of 1802, rheumatism distinctly stated as one of the existing

causes of chorea; and in later editions, as in that of 1820, I find it stated, that "chorea sometimes alternates with acute rheumatism," but through what organ or by what intervention this occurs is not conjectured. In the 15th volume of "The London Medical Repository," published in 1821, a case is stated by Dr. J. Copland, in which this alternation took place, and was succeeded by complete paralysis, and in this case both effusion had taken place into the pericardium, and the most marked and extensive deposit upon the spinal theca. This, however, did not lead to any decided remarks upon the connection of the chorea with the pericarditis, but throughout the spasmodic disease appears to have been referred very much to the affection of the membranes of the spinal cord, and the same appears to be the view of the author in his late more elaborate dissertation, included in his most valuable work on practical medicine; and he enumerates amongst the exciting causes of the disease, "metastasis or extension of rheumatism to the membranes of the spinal cord;" but does not refer to a similar metastasis to the pericardium as being an exciting cause. Speaking, however, afterwards of the treatment of the complicated and irregular states of this disease, he says, "The association of this disease with rheumatism has been observed by me on several occasions, and in nearly all there has been a marked disposition of the rheumatic affection to recede from the joints or extremities, and attack the internal

fibro-serous membranes, as those of the cerebro spinal axis, and the pericardium."

Dr. Copland also refers to some cases and dissection by Dr. Prichard, of Bristol, published in the twenty-first volume of the "London Medical Repository," in which, however, though the heart was found adherent to the pericardium in the only case in which the state of those parts was referred to, yet the author considers the chorea as depending on the inflammation of the membranes of the spine.

Having had my attention all my life, through the lectures of Dr. Babington, Dr. Curry, and Dr. Cholmeley, directed occasionally to this subject, it has occurred to me to see many cases of the combination and alternation of rheumatism and chorea, and some which have convinced me that amongst the causes of chorea, however numerous they may be, (and some undoubtedly belong to far distant parts of the body,) inflammation of the pericardium has been one.

The case which I have just detailed is the most striking with which I have met, because the dissection, which showed so great a share of disease in the heart and pericardium, failed to give the slightest trace of disease in the membranes or the substance of the brain, or medulla oblongata, or the upper small portion of the chord which was examined; but I have met with a great many others, in which the inflammation of the pericardium could not be

doubted; in which, however, the total absence of anything like the paralytic state, described by Dr. Copland in his interesting and complicated case, leads to the belief that the membranes of the cerebro spinal axis were not materially implicated.

I was called to see a young lady, in consultation with the late Dr. Lister, about twelve years ago. The catamenia had been irregular, and she had suffered from rheumatic affections of the joints, though not in the genuine form of severe rheumatitis; several of the joints were puffy, slightly inflamed, aching and tender; and she had now begun to show symptoms of involuntary motion—the movements and actions, in fact, of complete chorea. The heart was agitated, and to it the chief uneasiness was referred; the pulse was hurried and irregular; on listening to the heart a "frottement" was distinctly heard. I had no doubt of the inflamed state of the pericardium. Remedies were applied, both local and general, under this impression, and the lady recovered completely, and is now living, the happy mother of a family.

Very shortly after this I had a case under my care, in the Clinical ward, of a man belonging to a public-house, who, in the midst of his daily exposures, had become the subject of a form of rheumatism, very similar to that I have just mentioned in the last case, and what served still more to render the cases similar was, that in both it was accompanied by an eruption of the roseola annulata. This man also became the subject of peri-

cardial inflammation and of chorea, and got slowly well.

I had a young woman under my care, about two years ago, with acute rheumatism. Her cure went on steadily and well, but I went one day expecting to find her convalescent, when I perceived some peculiar movements of the hands which made me suspect the approach of chorea. I examined her heart, and found symptoms which, in connexion with the previous rheumatitis, left no doubt on my mind that the pericardium was inflamed. I put her on the use of calomel, and opium, and tartarized antimony. The chorea went on to its complete development in a few days, but both that and the rheumatic affection of the heart gradually subsided, and she left the hospital well.

In some of these cases there might, perhaps, be a doubt of the correctness of the diagnosis, as regards pericarditis; but I was consulted about two years ago in a case where, unfortunately, there was no room for doubt. It was the son of a medical practitioner, about eleven years of age, and in addition to the most unequivocal signs of the lesion which the heart had suffered, the breath was becoming short and oppressed, and the feet were beginning to swell. The history of this poor lad was shortly as follows:—within the last two years two very severe attacks of rheumatism, in both of which most direful inflammation of the heart took place, and with each attack chorea, so severe that he threw himself from one end of the bed to the other, and required the

constant care of more than one attendant to prevent his injuring himself. He has greatly improved in all his symptoms.

I have at this time a lad under my care in whom the same alternation of disease has taken place, and who is now labouring under rheumatism, though his chorea has left him.

In short, the instances are very numerous; and though I doubt not that in some cases the coverings of the cerebro spinal mass may be, and are, implicated, yet I believe that the much more frequent cause of chorea, in conjunction with rheumatism, is the inflammation of the pericardium, and that the irritation is communicated thence, probably, to the spine, just as the irritation of other parts, as of the bowels, the gums, or the uterus is communicated, and produces the same diseases; for I do not at all incline to the belief, that inflammation, in or about the spine, is necessary to induce chorea.

The third case which I wish to submit to the Society is of a character altogether different from the two former, and serves to show how symptoms may arise in chronic disease when the pericardium becomes implicated, which may give a peculiar aspect to the case, and embarrass the diagnosis.

In the month of May 1838, I was requested by Mr. James Ridge to meet him in consultation, in the case of a young lady only seventeen years of age, who, three months previously, had first begun to complain of a pain in the right foot and knee, and then in the groin, and extending up the side, so

that it was supposed that the liver might be in fault, and slight mercurial action was induced; after this the pain became less, and a fulness in the iliac region and the groin seemed to diminish. Three weeks before I saw her some of the inguinal glands enlarged, and since that some of the glands of the neck and under the left ankle; and for the last ten days a very hard swelling had taken place near the tuberosity of the ischium on the right side. It was quite plain that very extensive glandular disease was taking place; and although she had already lost one of her sisters of phthisis, as it was supposed, yet the general diffusion of the disease, without any pulmonary symptoms, seemed to render it probable that this was even more serious than simple tubercular disease.

She was ordered to go into the country, to keep up her general health as much as possible, and to take sarsaparilla.

She was removed to Brixton, but I was again requested to see her on the 19th of June; all her symptoms having been increasing, and, in addition to the rest, she had become the subject of the most alarming attacks of dyspnæa, coming on generally in the middle of the night with agitation and shaking, and apparent convulsion of the diaphragm threatening death, and resembling an aggravated form of hysteric convulsion. I could now feel an abdominal hardness like a tuberculated omentum, and there were now to be discovered a string of small very hard glands, tender to the touch, running along

the back on the left of the spine near the lower dorsal vertebræ.

I saw her occasionally after this: the attacks of dyspnæa and convulsion returned frequently at night, and assisted in wearing her out gradually, and she sunk upon the 9th of July.

Sectio Cadaveris.—The body was greatly emaciated. There were some subcutaneous tumours on the chest and abdomen. They were small, oval, flat, and some of them were softening at their centres.

Chest and lungs quite free from all tubercular deposit. The surface of the right lung had upon it several small hard malignant deposits, which, in one part, formed a fringe round the edge of the lung. The heart and pericardium formed a hard mass, firmly glued to the sternum by the white fungoid matter deposited in the anterior mediastinum, so that on raising the bone they were round like a hard tumour attached within.

The heart itself presented a curious specimen of disease: a thick layer of yellow malignant matter lined and covered the pericardium, both the portion attached to the heart and the reflected portion; the two deposits were strongly glued together in most parts, and were a quarter of an inch in thickness. In other parts the two layers were easily torn from each other. The phrenic nerve was seen on the right side passing down, pressed upon, and almost embedded in this diseased mass.

A very correct representation of the section of the heart, when the apex and about one-third of the organ had been removed by a transverse section, may be seen in Plate I. In the abdomen, the glands of the mesentery, and the glands along the iliac vessels and up the spine, were all greatly enlarged and impregnated with yellow fungoid matter, forming large masses, particularly about Poupart's ligament. The ovaries on both sides were completely fungoid. The left was of the size of an orange, formed of rounded masses, soft, and in some parts cerebriform; in others, approaching to the hæmatoid form of fungoid disease. The right ovary was of the size of a very large gooseberry, and contained one or two decided malignant tubera, situated almost as if developed in the Graafian vesicles. On the broad ligaments were two or three small malignant deposits; and the Fallopian tubes were fleshy, thick, very vascular, and red.

That the peculiar and very alarming train of symptoms which assisted in wearing out this patient, depended on the condition of the heart and pericardium, I think there can be no doubt; and the nature of the attacks would render it probable that the phrenic nerve was more particularly implicated in the irritation produced. It is my full conviction that I have had a similar case within the last year in a gentleman, whose symptoms were very obscure, but accompanied by most frequent and distressing agitation of the diaphragm,

coming on in paroxysms chiefly at night, and reducing him to the utmost state of debility and exhaustion; as, however, in this case no post mortem examination was permitted, the cause of these paroxysms must ever remain matter of speculation.

CASE

OF

MALIGNANT DISEASE

OCCUPYING ONE HALF OF

THE TONGUE,

IN WHICH

A LIGATURE WAS APPLIED FROM BENEATH THE JAW.

By JAMES M. ARNOTT,

SURGEON TO THE MIDDLESEX HOSPITAL.

READ NOVEMBER 13TH, 1839.

When malignant disease has attacked the tongue, and the situation of the part affected has permitted it, this has sometimes been removed by excision—sometimes by the employment of the ligature. The latter method has usually been preferred when the extent of disease has been at all considerable; and by means of the ligature applied in the ordinary way through the *mouth*, the whole of the anterior or moveable portion of the organ may be removed. But when the morbid affection has extended further back, and encroached upon the basis of the organ, this mode is no longer available; and, under such circumstances, the disease has generally been regarded as incurable, and the patient left to his fate.

Yet, by a different manner of proceeding, some cases of this description are still within the reach of surgery, and therefore some account of this, as exhibited in the following instance, may not be devoid of interest to the Fellows of the Society.

Hannah Hayward, fifteen years of age, was admitted into the Middlesex Hospital on the 8th of May 1838: the right half of the tongue was occupied by a tumour which projected from its upper and under surface, extended from nearly half an inch of the apex to the isthmus faucium, protruded at the edge between the teeth, and in the mesial aspect overstepped this line, and by compression had considerably reduced the width of the left or sound half of the organ. The bulk and form, generally, of the swelling, were those of a pullet's egg, but with irregular outline. The prevailing colour was purple; in parts, however, yellowish grey, apparently from effusion of lymph underneath the cuticular covering. Posteriorly, the upper surface was covered by warty excrescences: anteriorly, it presented a vesicular appearance, from serous effusion into the papillary structure. The substance of the tumour was firm, solid, and unyielding to compression. Soreness of the part was complained of, and pain was felt in the ear. Trifling bleeding had occasionally taken place from the part, and was readily excited by rough handling, but soon ceased. There was no enlargement of the neighbouring lymphatic glands, and the patient looked well. She had never menstruated.

From the statement of the girl's mother, and her own, it appeared that nine years ago, a blue swelling, the size of the tip of the finger, was first observed on the upper surface of the tongue; that this remained stationary until six weeks previously, when, while she was under the influence of some pills which she had taken for fits, with which she had been attacked, the tumour rapidly increased, and had continued to do so. There was *now* no evidence of her having been affected by mercury.

After clearing the bowels, the iodide of potassium was exhibited internally for above a fortnight, but without benefit; subsequently, the extract of hyoscyamus, as recommended by the late Mr. Earle in some cases of tumour of the tongue, but with no better result. Locally soothing the parts and keeping them quiet were first tried; afterwards, astringent lotions and the solid nitrate of silver. This latter application so greatly relieved the soreness, that the patient repeatedly requested its renewal; but it had no effect upon the size of the swelling. The potassæ hydras was used twice, but it excited bleeding and irritation.

The disease then did not seem to admit of relief by medicine, from which indeed little had been expected; and, in the mean time, I had considered and decided on the operation I should adopt. The size of the swelling had now materially increased, filling the concavity of the palate, and the sublingual space; it measured $2\frac{1}{2}$ inches in length, —$1\frac{1}{4}$ in breadth,—and $1\frac{1}{2}$ in thickness,—reducing

the left half of the tongue to a narrow strip. In the ordinary situation of the parts, the limits of the disease could not be seen; but by causing the tongue to be protruded, and drawing it forcibly over to the left side, the boundaries of the tumour could be traced by the finger passed along its outer edge, under the arch of the palate, where sound structure could be felt beyond. On the mesial aspect and superior surface the warty excrescences previously mentioned, had so overlapped the left half of the organ, as to render it impossible to trace the sulcus naturally existing in this situation. The presence of these growths, and more especially the prominence in this direction of the swelling itself, rendered it more difficult to distinguish the boundaries of the disease on the upper surface posteriorly, which were, however, satisfactorily made out. Inferiorly, in the corresponding situation, this, of course, from the attachment of the parts, could not be done, but from the examination, as far as it could be carried, and the degree of persistent mobility of the organ, it was inferred that the disease did not include the whole of the basis below. Although the patient had menstruated during this period, her general health had become impaired; she was pale, and had an expression of anxiety as well as of suffering on her countenance.

On the 6th of June, the following operation was performed: The patient being seated, the head slightly extended, and the os hyoides felt, an incision

was made from over it upwards and forwards, an inch and a half in length in the mesial line, through the skin, cellular substance, and raphe, of the mylo-hyoid muscles. With the edge of the knife, but chiefly by its handle, way was made for the finger between the two genio hyoid and the two genio glossi muscles. A tenaculum was next passed through the apex of the tongue, by means of which it was drawn out of the mouth and held so, during the subsequent part of the operation by Mr. Mayo (Mr. Tuson, Dr. Warren of Boston, U. S., and Mr. B. Phillips, being likewise present). Into the wound in the neck, a strong needle with an eye at the point in a fixed handle, was now conducted and passed through the basis of the tongue into the pharynx, a little to the left of the mesial line: the loop of ligature which it carried was then, by means of a blunt hook, drawn forwards out of the mouth, and the needle withdrawn from the wound over one of the ends. The loop being cut, two ligatures were obtained; one of these was placed along the upper surface of the tongue, so as to bound the disease on its left side, and carried through the apex of the tongue from above downwards by means of a large curved needle, through which the oral end of the other ligature was *now* also passed. Fixed in a porte-aiguille, this needle was next carried through the floor of the mouth immediately behind the last molar tooth, on the right side, directed at first, and for the greater part of its course, perpendicularly

downwards, then inclined mesial, and brought out at the incision in the neck. There were thus two ligatures, the four ends of which hung out of this wound: one of the loops was so disposed as to encircle the right half of the tongue at its basis beyond the tumour (*aa*, Plate II.); the other (*bb*) was placed longitudinally on the upper surface of the tongue, longitudinally and obliquely below. Being tied, (and this was done as tightly as possible,) the diseased mass was circumscribed posteriorly, laterally, and, in some measure, inferiorly. A third ligature (*c*) was now passed through the fore-part of the tongue, so as to isolate at this point the diseased from the healthy structure.

The patient endured the operation remarkably well, and no retching occurred to interrupt its progress, the pain experienced on tightening the ligatures was, no doubt, very considerable, but not so much so as had been anticipated.

The effects of tying these, independent of the pain, were, that in a few seconds, the included part became of a deep livid colour; that by the action of the second mentioned, or longitudinally disposed ligature, the diseased mass was turned more prominently upwards, and the narrow sound part drawn so much downwards as to be now scarcely perceptible; that the tongue became fixed in the mouth; and that the patient was unable to articulate or to swallow.

An opiate enema was given immediately on her

removal to bed. In the evening the severity of the pain had somewhat remitted: she complained of it chiefly in the right ear, and jaw, and this had been in some degree relieved by warm opiate fomentations.

The sound half of the tongue was now beginning to swell, and its surface was dry. She complained much of thirst, which was mitigated by frequently pouring cold water over the parts in the mouth from a feeder, allowing it again to flow out of the mouth; but was most effectually relieved by half a pint of milk and water being conveyed into the stomach through an elastic gum catheter, introduced along the left side of the mouth into the œsophagus. Through this, for the next fortnight, all food and medicine were administered. During the night the patient had two hours sleep, and in the morning was in less pain. Without entering into minuter details of the case, it will be sufficient to state that the febrile disturbance, the tumefaction of the sound parts of the tongue, and the salivation which ensued, were moderated by active purging, and that a blush of redness with swelling, which took place on the outside of the neck under the angle of the jaw, were removed by the same remedies and fomentations, and that the fœtor arising from the state of the parts within the mouth was corrected by a weak chloride of lime wash.

On the second day after the application of the ligatures, the circumscribed portion of the tongue

was black and pulpy, and portions of it began to separate. This continued until the fifth day, when, on removing some of these, I discovered that the sloughing was confined to the surface, and that the more solid body of the tumour underneath was still alive, as it bled on being scratched. I endeavoured to complete the strangulation by carrying a canula over the ligatures, hanging out at the wound of the neck up towards the root of the tongue, and tightening these, afterwards by twisting and maintaining them so, but without a successful result.

On the eleventh day the condition of the parts was as follows: the *diseased* was completely separated from the *sound* half of the tongue by a deep trench, so as to give it a truly bifid character, and the trench was continued across the basis, seeming to extend through the whole thickness of the part. The tumour was lessened in size by the sloughing of its surface,—it had wholly lost its vesicular and warty character, was of a pale red colour,—felt firm and resisting generally, and hard posteriorly. About the middle of its dental edge its colour was livid, and close to this on the upper surface the latter was irregular and ulcerated. Reunion by granulation had commenced between the diseased and sound portions of the tongue, but this was easily broken down by the probe. It was now evident that the former part derived some vascular supply from below, and the following method was employed to cut this off. —A loop of silver wire, properly bent, was passed

over it, from the mouth, carried and depressed into the trench already mentioned as surrounding it, and being drawn forwards, the diseased part was found to be placed completely above the level of the loop. The two ends of the wire were next passed through a double polypus canula, and this being carried home under the tumour, to what may now be considered as its neck, the ligatures were tightened, the death of the part effected, separation ensuing on the fifth day (the seventeenth from the first operation).

The process of cicatrization proceeded favourably, and on the 10th of July the patient left the hospital. I have seen her repeatedly since, and at present there is no appearance of the disease recurring.

It will be recollected that the mere tip of the tongue on the right side not having been included in the disease was not removed. For some time the patient was much annoyed by her inability to distinguish the taste of substances coming into contact with this portion of the apex, and by its getting perpetually pinched between the teeth. Although the former condition remains unchanged, as I have this day (Nov. 13th) ascertained by the application of sapid bodies, she has become reconciled to it, and the latter does not now occur. For a longer time she was incommoded by food getting into the cavity left by the operation, and either remaining there unnoticed, or when she was aware of it, requiring the employment of the finger for

its removal. But partly from the space there being diminished, owing to the development of the previously compressed parts, and partly from having acquired a greater degree of power in the use of the tongue towards its displacement, she is not subjected to as much inconvenience as heretofore.

The motions of the tongue are restrained by the cicatrix attaching it to the bottom of the mouth, and the tip cannot be protruded beyond the teeth, but a stranger would not discover by her speech that she had lost so large a portion of it, he would merely remark that she lisped.

The idea of the operation, which has been now described, was taken from those performed by M. Jules Cloquet and M. Mirault respectively, in two cases of cancer of the tongue. In a man who had this disease seated on one side of this organ, and which could not be removed by incision or the ligature applied through the mouth, M. Cloquet operated thus:—Having made a small incision in the mesial line of the neck above the os hyoides, he passed a curved needle, having an eye at the point and fixed in a handle, through the base of the tongue, and carrying the handle backwards caused the point to project between the teeth. Through the eye two ligatures were passed, and the needle being withdrawn, carried the ligatures through the tongue. The free part of this organ anterior to the frenum was next divided in its middle, and the needle being reintroduced at the wound in the neck, its point was

made to appear in the floor of the mouth just before the frenum. The oral ends of both ligatures were next passed through its eye, and the needle being withdrawn, one of the loops thus formed was disposed longitudinally on the middle of the tongue and in the angle of its division; the other across, so as to surround it on the outer side. Being tied, the cancerous part was included between them. The operation terminated unfavourably, the patient dying in three days.

In a case of alleged cancerous tumours, with ulceration of the tongue, which M. Mirault met with in a woman, (aged 23,) and which occupied the centre of the organ in almost its entire width, two modes of operating presented themselves to the mind of that gentleman, who was not at the time aware of M. Cloquet's case. One of these was to apply two ligatures to the tongue immediately in front of the arch of the palate, in order to intercept the circulation through the part, and to divide it transversely, and then, "dans un second temps," to extirpate the anterior portion of tongue, by detaching it with scissars from the floor of the mouth.—The other was to tie both lingual arteries, and having thus guarded against hæmorrhage to extirpate the cancer. M. Mirault determined upon adopting the latter proceeding, but in attempting it, he failed in finding the left lingual artery, though he succeeded in tying the right. Fifteen days subsequently, in order to controul the circulation through the left, he placed a ligature around this half of the

tongue, for which purpose he made an incision from about a finger's breadth under the chin to the os hyoides, and by this a needle was carried through the base of the organ into the mouth, out of which he drew the needle: this was again carried into the mouth, and through its floor, directly in front of the arch of the palate on the left side of the tongue, and brought out at the wound under the chin.

The ligature being tightened cut its way through the tongue in nine days, and during this time the tumour sensibly diminished, and the edge of the ulcer became less hard and prominent. To complete the operation nothing now remained but to detach the parts from the floor of the mouth, and to divide the right half of the tongue.

M. Mirault preferred doing this "en deux temps," and reversing the order just mentioned, he resolved to effect the division of the right half by means of a ligature, as had already been effected on the left.

Having done so, the beneficial results were so remarkable, that the remaining step of the operation was postponed—then abandoned—in fact, the tumour rapidly decreased, and the ulcer began to heal, so that in twenty-seven days from the last operation, the former was reduced to the size of a nut, and the latter was in great part healed. Two months subsequently the tongue had resumed its natural size, and presented a very dense cicatrix on its surface, but the tumour had entirely disappeared.

At this time the patient could move the tongue freely, could speak so as to be readily understood, and the sense of taste was retained on both sides of the tongue.

MEMOIR

ON

TUPHLO-ENTERITIS;

OR,

INFLAMMATION AND PERFORATIVE ULCERATION

OF

THE CÆCUM,

AND OF

THE APPENDIX VERMIFORMIS CÆCI.

BY JOHN BURNE, M.D.

PHYSICIAN TO THE WESTMINSTER HOSPITAL, LECTURER ON THE PRACTICE OF MEDICINE, ETC.

READ NOVEMBER 27TH, 1838.

SINCE I had the honour of laying before the Society, in May 1836, an article on the Inflammation and Perforative Ulceration of the Cæcum, and of the Appendix Vermiformis Cæci, I have had opportunities of observing and treating more of these cases, which, as they serve to illustrate further the pathology of the cæcum and appendix, will, I trust, be found not uninteresting to the Society.

The cæcum, in common with other parts of the alimentary canal, is liable to various forms of disease; but it is not my purpose, on the present occa-

sion, to treat of the pathology of the cæcum and appendix generally, but to confine myself to those affections which result from the peculiar conformation, disposition, and organization of these parts.

The peculiarity in the organization of the cæcum, which bears upon the present subject, is the absence of a peritoneal tunic at its posterior part, where it is fixed and attached by adipose cellular tissue to the iliac fascia, so that in the event of a perforative ulceration in this direction an abscess would form behind, and without the peritoneum upon the iliac fascia, and direct its course to the lumbar region at the outer edge of the quadratus lumborum muscle, as described in the former memoir.

Now of the whole tract of the large intestine, no part is so exposed to the lodgment of undigested substances as the cæcum, owing to its particular conformation, as well as to its being the portion of the large intestine with which the undigested substance comes first in contact. These circumstances, strengthened by the fact that many of the patients attacked with inflammation of the cæcum remember to have swallowed accidentally, or to have taken as part of their ordinary food, matters likely to pass the stomach in an undigested crude state, admit of the conclusion, that the greater number of the cases of inflammation of the cæcum are to be ascribed to the prolonged irritation of bodies so lodged, and that such inflammations are therefore properly symtomatic; a conclusion borne out, moreover, by the manner of attack, which is characterized by the deve-

lopment of the local preceding that of the general symptoms, and by the absence of the chills and rigors, which usher in idiopathic inflammation. The inflammation is developed slowly in one person, speedily in another, owing to the greater or less susceptibility and inflammatory predisposition of the individual. That inflammation of the cæcum may be idiopathic, and arise from the ordinary exciting causes, cold and vicissitudes of the weather, there can be no doubt; though the instances are rare in comparison with those which may be fairly attributed to the irritation of crude substances, which have reached the cæcum and lodged in its pouch.

The termination of this symptomatic inflammation of the cæcum is usually by resolution; the symptoms yielding at the end of five or six days, and subsiding altogether soon afterwards; except in patients of an inflammatory or gouty diathesis, in whom inflammation once excited will continue in a sub-acuto-chronic form, and require several weeks for its removal, notwithstanding the original exciting cause shall have passed away. The termination by perforative ulceration and abscess is rare, and probably never occurs when the cæcum was sound prior to the attack; the open channel of the colon permitting the passage of the irritating body, as soon as the subsidence of the spasm and the removal of the inflammation allow the muscular tunic of the cæcum to resume its function. No instance has come within my observation in which, upon dissection, perforative ulceration of the cæcum has been

found; all the cases of inflammation of the cæcum and of supposed perforation, within my knowledge, having recovered; and, in the cases on record, there is evidence of disease in this gut having existed previously.

CASE IX.

Sub-acute Tuphlo-enteritis, or Inflammation of the Cæcum.

R. M——, Esq., while travelling to town from Herefordshire, on Friday, the 20th of October 1837, was seized with pain in the abdomen, followed by sickness and vomiting. On the second day, in the morning, he was seen by Mr. Freeman, to whom he complained of pain in the right ilio-inguinal region, of frequent vomiting, and of an interruption in the usual action of the bowels. Calomel in the dose of five grains was given; and at noon, the symptoms continuing, blood was drawn, and the calomel repeated. In the evening the pain had diminished, and the vomiting ceased, when sulphate of magnesia in mint-water was prescribed. On the third day the bowels acted, and all the symptoms seemed to be subsiding.

On the fourth day the pain and sickness returned, on which account my attendance was requested. I found Mr. M—— labouring under pain, still referred to the region of the cæcum, where I could distinguish a tumour very tender and deep-seated, but not hard; the rest of the abdomen was soft, and

bore pressure without uneasiness; the tongue was furred, the pulse frequent, the stomach irritable; the skin was perspiring, the effect of a hot bath he had just taken. Recognizing this as an inflammation of the cæcum, I questioned Mr. M—— as to what he had been taking lately of an indigestible nature, when he called to mind having eaten some apples whilst out shooting a fortnight before.

Hydrarg. chloridi, gr. ½; opii, gr. ¼, every eight hours, with an effervescing saline aperient, composed of Sodæ potassio-tartratis, ℈ij; Sodæ sesquicarbonatis, ℈j; Acidi tartarici, gr. xiv.—Misce.

On the fifth day, some pain and tenderness remaining, eight leeches were applied to the cæcal region; the same medicines persevered in. The result was that the bowels soon acted freely, the sickness abated, the pain, tenderness, and tumour gradually subsided; and in a few days passed away altogether. From this time the recovery was uninterrupted and perfect.

Cases of this description are of frequent occurrence, and, although sub-acute in degree, are well marked; the symptoms pointing to inflammation of the cæcum as the pathological condition. The cause too is obviously referred to the having swallowed some indigestible substance within a short time of the attack. Two cases exactly similar to the above were admitted into the Westminster Hospital in the spring of last year. One of these patients attributed his attack to having eaten raw turnips in the

field, he being in a state of hunger and destitution; and as the case proceeded portions of broken down turnip were discovered in the evacuations.

CASE X.

Acute Typhlo-enteritis, or Inflammation of the Cæcum.

On the 15th of November 1835, I was called in consultation with Mr. Cox to visit Mr. S——, a gentleman of middle age, and of full habit and stature. He was very ill in bed with pain, great tenderness, and a deep-seated resisting circumscribed fulness, amounting almost to a tumour, in the right ilio-inguinal region; the rest of the abdomen was full and slightly tender, but free from pain; the bowels had been obstinately confined for several days, and sickness and vomiting were frequent; the tongue was very much loaded, the urine red with copious deposit of the lithates and purpurates, and the skin of a feverish heat; the pulse was frequent, rather large, but compressible. He had been bled and leeched, had used a hot bath, and taken calomel and purgatives. The countenance was anxious, and he was much exhausted from several days' suffering, as well as from the necessary antiphlogistic treatment.

The disease was manifestly an inflammation of the cæcum. Calomel and opium, with the saline effervescing aperient every four hours, were prescribed: the part to be frequently fomented.

The symptoms persisted for two days, when evacuations took place, and he began to recover. The evacuations, though kept up afterwards without difficulty, were insufficient; and there remained the same deep-seated circumscribed resistance in the region of the cæcum, with fulness and flatulence of the belly, and a sensation to the patient that he wanted to be more freely purged, the bowels seeming to him to act only to a certain point, from which the flatus, instead of passing on, would roll back in the intestines. On this account he took a brisk cathartic, composed of colocynth and calomel, followed by senna and salts. These, instead of producing relief, brought on a return of sickness, an increase of the fulness and of the pain in the cæcal region, and induced us to return to the more mild and appropriate saline aperients, under the use of which the unfavourable symptoms again subsided.

His health, however, did not forthwith return; the tongue remained foul, the appetite defective, and the circumscribed fulness was still to be felt in the region of the cæcum. To resolve this, mercurials were persevered in, and it was not until after five or six weeks of strict regimen, and the daily use of a saline aperient, that all evidence of the local disease passed away and recovery was established.

In another instance, that of Mr. H. F——, a gentleman also of full habit and middle period of life, which occurred in December 1837, there was the same disposition for the inflammation to continue in a sub-acuto-chronic form; as indicated by the

imperfect return of health, by a sensation of the bowels, though open, not relieving themselves fully, they seeming to act to a certain point and there to meet with difficulty and obstruction, causing the flatus to roll back; together with obscure symptoms referred to the cæcum.

In this patient some little angry aphthous vesicles showed themselves in the mouth, phenomena strongly indicative, at this age, of a tendency to organic disease or of its actual existence in some part of the alimentary canal. He experienced also the sensation of requiring strong purgatives, and desired to take them; but the experience of the former case made me object. By the use of a blue pill every third night, and of a saline aperient every other morning, he recovered perfectly in a few weeks.

The tendency in the inflammation to continue in a sub-acuto-chronic form, in these cases, should be suspected and narrowly watched, and an abstemious diet with saline aperients and mercury should be insisted on, until all trace of the local affection has disappeared: without these precautions there may continue an obscure disorganizing pathological congestion, which would produce thickening and contraction of the cæcum, with all the sufferings and fatal consequences of permanent organic disease and obstruction of this part of the bowel; as illustrated by the Cases III. and IV. in the first Memoir.

Having witnessed the salutary, and, I may say, the surprising effects of the natural saline springs in

stricture of the alimentary canal, I have strongly advised those patients whose recovery has been delayed, to repair to Cheltenham, or Leamington, or Norwood, for a few weeks; but their affairs not permitting them to leave town, the saline aperients have been substituted, and have hitherto proved effectual.

Of the perforative ulceration of the cæcum from within, no case, verified by dissection, has occurred under my own observation. One is detailed by Ferrall,* in which the patient stated "that he had a cough a long time, and for the last four months had been subject to bowel complaints, occasionally passing blood, and suffering more or less pain in the right iliac region," symptoms which indicated tubercular ulceration of the intestinal mucous membrane. A tumour formed in the right groin burst in a few days, and through the opening were discharged fæces and caraway seeds. The patient died; and on dissection were found several ulcers in the cæcum, one of which had perforated the posterior wall, and communicated directly with an abscess in the iliac fossa, the abscess communicating with the external opening in the groin.

Perforative ulceration of the cæcum from without is common, and takes place in those cases of circumscribed abscess resulting from perforation of the appendix, the abscess bursting into the cæcum

* Edin. Med. and Surg. Journal, vol. xxxvi. p. 12, Case No. 4.

and discharging itself by the channel of the large intestine. This is the most favourable termination of abscess from perforation of the appendix.

Of the Inflammation and Perforative Ulceration of the Appendix Vermiformis Cæci, consequent Abscess, and Peritonitis.

In a former memoir* I took occasion to refer to the conformation and situation of the appendix vermiformis cæci, as influencing very materially the phenomena of inflammation and perforative ulceration of this process. The truth of this opinion, as also the importance of the relative anatomy of this insignificant appendix, has been illustrated by additional evidence, which has further shown how very variously the appendix may be situated in different individuals; this variation depending mainly on the disposition of the meso-appendix.

The origin of the appendix from the cæcum is pretty uniformly at the inferior, inner, and posterior part; while the appendix itself depends sometimes in the pelvis, or more frequently lies in the iliac fossa at the outer edge of the psoas, convoluted beneath the cæcum, and concealed by it; and, lately, I have met with two instances in which it was given off at the inferior, posterior, and outer part of the cæcum, and having proceeded directly outwards for

* Med. Chir. Transactions, vol. xx.

about half an inch, turned abruptly round the inferior and outer portion of the cæcum, and extended its whole length straight upwards along the outer part of the cæcum and colon, and lay in the angle formed by the peritoneum as it passes from the cæcum and colon to the iliac fascia and the loins. The extreme point of the appendix reached so far as to localize the symptoms of inflammation and perforative ulceration in the iliac region; causing necessarily an embarrassment in the diagnosis.

CASE XI.

Enlargement of the Appendix. Sero-enteritis originating in the Peritoneal Tunic of the Appendix.

Mr. R——, aged 31, applied, on the 22nd of January 1831, to Mr. F. Odling, in consequence of rheumatic pains in the head and limbs, with feverishness and confined state of bowels; all of which ailments were relieved by appropriate medicines.

On the 24th, in the afternoon, Mr. R—— went to the hairdresser's, where, having been kept waiting in a cold room, he was seized with a shivering which persisted till he had returned home.—Second day. Mr. Odling found him complaining of pain in the right inguinal region, the tongue being white, the pulse very frequent, and the bowels not open: calomel and aperients were given.—Third day. In the morning the pain was severe, and had diffused itself over the abdomen, its chief focus remaining in the

groin; great tenderness had supervened, the pulse was rapid and small, fever high, and great anxiety in the countenance; the respiration, which increased the pain, was short and frequent: calomel and opium were given; blood was drawn to ʒxvi, and in the evening 24 leeches were applied to the groin.

On the fourth day of the inflammation, I was called to visit the patient in consultation. He was lying on the back, breathing rather slowly and deeply; the face was of a pale leaden colour, the lips blue, and the features sharp; no pulse at the wrist;—the action of the heart was as rapid as possible, and barely perceptible; the extremities dark, cold, and clammy; the belly flaccid and soft, except in the right groin, where some deep resistance was palpable. He died in a few hours.

Necrotomy, eighteen hours after death.—The abdomen, laid open, presented no anormal appearance till the omentum was raised, when it was discovered that the cæcum, the convolutions of the small intestines which depended in the pelvis, as also that part of the sigmoid flexure of the colon which projected towards the cæcum, were agglutinated together by concrete adhesive fibrine spread over these parts like a thick membrane, and dipping into the furrows formed by the contact of the convolutions of the intestines, but not extending beyond this line of contact to the mesentery. The peritoneal tunic of these parts was minutely vascular, and easily peeled off. At this stage of the dissection was discovered a body depending from the cæcum in the pelvis,

which proved to be the appendix in a diseased state; its peritoneal tunic was covered, likewise, with a thick layer of concrete fibrin.

The bulk of the appendix was several times larger than usual, and consisted chiefly of deposit between the serous and mucous coats, by which the intervening coats were converted into a dense compact white tissue. The meso-appendix was loaded with adipose substance, which contributed to increase its general bulk; the canal of the appendix was pervious, and its mucous lining sound. The cæcum was in the same diseased state for a considerable distance around the mouth of the appendix, that is, very much thickened by a compact dense tissue between its serous and mucous tunics, which had the effect, also, of contracting its natural dimensions. The thickening extended to the ileo-cæcal valve, and obliterated it in a great degree.

Looking at the enlarged appendix separately, it might be considered as in a state of simple though excessive hypertrophy, but, when the condition of the cæcum is associated with it, the anormal state of both organs must be attributed to a pathological congestion at some former time; and on the Celsian principle that "quoties offensum corpus est, vitiosa pars maxime sentit," it is probable that, a cold having been caught, the consequent inflammation localized itself in the appendix, to which the symptoms during life pointed as the focus of the peritonitis.

CASE XII.

Concretions in the Appendix Vermiformis Cæci, Pelvic Abscess and Peritonitis: the Appendix being situated in the Pelvis.

Sarah Reynolds, aged 24, admitted into Guy's Hospital on the 4th of March 1831. The short notes which I have of this case say, that she was seized with an abdominal and pelvic inflammation, about six weeks after delivery, and died in consequence. On dissection, an abscess was found in the anterior part of the pelvis, between the peritoneum bladder and os pubis, with inflammation of the corresponding pelvic peritoneum, to which was agglutinated the extremity of the appendix: the appendix, in this case, hanging in the pelvis. In the canal of the appendix were two or three dark concretions, the size of raisin stones, but the mucous and serous tunics, as also the general organization of the appendix, were reported to be sound.

How far the concretions in the appendix and the pelvic abscess, in this case, were connected as cause and effect, there is no evidence to show. I have thought the case worth recording, on account of the situation of the appendix being in the pelvis, of there being foreign bodies in its canal, and inflammation and abscess in the immediate vicinity. Had there been a perforative ulceration of the appendix, from the irritation of the concretions, then the neighbouring peritonitis and abscess would have been a natural consequence.

CASE XIII.

Perforative Ulceration of the Appendix Vermiformis Cæci; Abscess discharged by the bowels; recovery.

Sir John M——, a gentleman past the middle age of life, was taken suddenly ill on the 29th of August 1836, on his arrival in town, with pain and fulness of the abdomen, constipation, and sickness; for which calomel, opium, colocynth, and enemas had been administered. I saw him on the 31st, in consultation with Mr. Freeman.

He was then sick, and at times vomiting. He had flatulent fulness of the belly, and pain referred to the right ilio-inguinal region, where was great tenderness and a deep-seated hardness: the bowel had acted slightly, the pulse was frequent and compressible, the tongue rough, brownish, and disposed to be dry. There was a general prostration of power, which forbad the abstraction of blood from a vein; we therefore directed twelve leeches to be applied to the seat of pain, fomentations to the abdomen, and an effervescing saline aperient to be taken every four hours. From this period he continued in a very precarious state for many days, vomiting matter like coffee grounds, the bowels acting with difficulty; the local symptoms persisting; and the tongue dry and brown, with increasing prostration. On one occasion, severe pain extended from the right ilio-inguinal region all over the abdomen, as if an universal peritonitis was setting in.

By the aid of calomel, morphia, and saline aperients, the more urgent symptoms were alleviated; but the local affection, instead of yielding, assumed the character of a distinct tumour, the size of a small orange, accompanied always with tenderness on pressure. At this time the patient was seen by Sir Benjamin Brodie, and the unguentum iodini comp. prescribed. The tumour resisted all the means employed for its resolution, and the general health remained impaired until, at the end of six weeks from the first attack, Sir John was seized with a diarrhœa, by which pus in a considerable quantity was evacuated. The tumour quickly diminished, and the local tenderness soon disappeared entirely. From this period the general health improved, and was gradually re-established without interruption.

The similarity of this case to Case VI. in the first article* is so exact, as to leave no doubt in my mind of the disease having been a perforative ulceration of the appendix, with abscess in the peritoneum, walled in by adhesive inflammation; the abscess having eventually burst into the cæcum and discharged itself by the large intestine. In the case No. VI. alluded to, the extremity of the appendix had sloughed, and the abscess formed in the peritoneum, precisely in the same spot, of the same size and general features, as the Case XIII. just related;

* Med. Chir. Trans., vol. xx.

but in Case VI., the patient sunk before a communication had been formed with the cæcum; which gave the opportunity of ascertaining, by dissection, the exact anatomical characters of the disease.

CASE XIV.

Perforative Ulceration of the Appendix Vermiformis Cæci, from a concretion lodged in its canal; Peritonitis; Death.

Master Baker, a well grown youth, 14 years of age, complained for several days of pain recurring frequently in the stomach and bowels, supposed to proceed from mince pies he had eaten about Christmas time. The pain grew worse, and fixed about the left iliac region on Saturday the 6th of January 1838. He was now questioned by his parents as to what he had eaten or swallowed, and he recollected having accidentally swallowed a small plated pencil-top, such as is used for pocket-book pencils; and to this the symptoms were attributed. The pain continued, made him ill, and began to disturb the circulation. Fomentations were applied to the abdomen, and aperients administered which produced six or seven dejections, and for a time gave relief. Sunday, second day, at eight in the evening, the pain returned with violence; and on the third day, in the morning, fixed in the region of the cæcum. Sickness and vomiting now supervened; the suffering was great: he was bled to 10 oz., and took calomel, opium, and saline aperients.

I saw him, in consultation with Mr. Armstrong,

in the evening of the third day. He complained of most severe pain in the region of the cæcum, which region I found full, hard, and tense, with tenderness so great, that he would scarcely allow me to touch the part: the pain was exacerbated from time to time; the whole of the abdomen was rather full, and all the muscles rigid from spasm; he lay upon his back inclined to the right side, with the right extremity bent upon the pelvis: the face expressed great suffering; the pulse was 124, rather wiry; and he vomited occasionally. He had recently taken a hot bath; and leeches, applied to the groin, were now bleeding. To take Hydrargyri chloridi gr. i, opii gr. $\frac{1}{6}$, every three hours, with a saline aperient: to repeat the bath.

After the bath he slept two hours and a half, and when he awoke the pain had shifted from the cæcum to the ascending colon; then, after a few hours, to the arch; and, at noon on the fourth day, it had reached the sigmoid flexure, in the region of which the tension was nearly as great, and the tenderness almost as exquisite, as it had been in the right ilio-inguinal. The exacerbation and throes of pain from spasm of the colon, were as violent as any I had ever witnessed; and the spasm of the muscles of the parietes rendered the whole abdomen as hard as a board. The pain shot to the testicles; the penis was in a state of priapism; the pulse was small and weak; the face was not only anxious but haggard; the teeth dry, the tongue rough and growing dry; and I was apprehensive he would die from the

violence of the pain. No dejection for the last three days.

The shifting of the pain along the tract of the colon, led us to suppose that the pencil-top was passing onwards, and that, if the bowel could be emptied by injections, the spasm would be relieved and the patient do well. In this we were disappointed, the result proving that the pain and spasm were produced by a quantity of hard friable fæculent matter, without any trace of the pencil-top.

To take Ol. Ricini ℥ſs., Tinct. Opii ♏x immediately; Enema e Decocto Papaveris et Avenæ statim; Haust. Potassæ Citratis c̄ Tinct. Opii ♏v every three hours.

Towards the close of the day he became easier, although the bowels did not act; but eructation, sickness, and occasional vomiting, continued.

Fifth day, morning; the symptoms had undergone no change: and, the bowels not having acted, recourse was had to the Enema Tabaci, in the proportion of three ounces with an equal quantity of gruel; about half of which injection passed up. In ten minutes he became sick and faint, and sweated about the forehead; but no evacuation from the bowels took place till 7 P.M., when he had two dejections, which were followed by so much relief that he instantly fell into a soft sleep. The dejections consisted of dry, knotty, hard, friable fæces, which were carefully examined without discovering the pencil-top. The character and quantity of these dejections sufficiently accounted for the spasm, and for the

pain shifting as this irritating matter passed along the colon. This cause being removed, we hoped for a speedy amendment.

Sixth day. Although the night had been passed tranquilly, we did not find the anticipated amendment. The abdomen was again hard and full, great tenderness in the right iliac region, and pain in the corresponding lumbar region. Two more evacuations had occurred without relief. To repeat the Enema Tabaci; to take Hyd. cum Cretâ gr. ii. every four hours, with the aperient effervescing draught.

The day was passed in a restless state. About 8 o'clock in the evening, a vast quantity of flatus passed from the bowels, which diminished the hardness and tension of the abdomen in every part except the right iliac fossa, and gave so much relief that he again went to sleep, and the pulse fell to 116.

Seventh day. I was called up between 4 and 5 A.M. The abdominal pain, tension and hardness had returned, the pain being exacerbated severely as from spasm; the pulse had increased in frequency, and every thing wore a bad aspect. The tobacco injection, the castor oil, opium and mercury, to be repeated. Throughout the day the stomach rejected every thing, and in the evening I found him with a rapid feeble pulse, hurried respiration, clammy sweats, signs of approaching dissolution. He died at half-past 2 o'clock on the following morning.

Necrotomy, 10 *hours after death.*—The abdomen

excessively tense and distended by gas in the small intestines. The omentum adhered to the right groin; the sigmoid flexure of the colon, distended with gas, reached over to the right side; its peritoneal tunic was covered with concrete albumen, as was the peritoneal tunic of the small intestines in the lower part of the abdomen. The omentum, sigmoid flexure, and the contiguous small intestines, adhered to each other, and to the cæcum; and the cæcum adhered at its interior and outer surface to the corresponding peritoneum of the abdominal parietes; the whole forming a mass which it was necessary to remove for examination. The whole of the colon, from the cæcum to the sigmoid flexure, was contracted and lying in its natural situation.

The small intestines were first examined. They contained here and there a little fœculent matter, but presented no anormal appearance. The examination was then pursued by laying open the extremity of the ileum, the cæcum, and whole of the colon, but no trace either of disease or of the pencil-top could be discovered.

We now proceeded to seek for the appendix, which was found lying under the cæcum on its outer side, in a direction upward towards the colon, and was covered with a thick layer of fibrin, which extended also to the outer portion of the colon, and the contiguous peritoneum. Here, about midway between its origin at the cæcum and its blind extre-

mity, was discovered a perforative ulceration, with a gangrenous edge, at the mouth of which protruded a small hard body, which we conjectured to be the pencil-top, but which proved to be an intestinal con-concretion, of an almond shape, about three-fourths of an inch long, three-eighths wide, and one-fourth thick: there was thin sero-purulent fluid amounting to eight ounces, in the abomen and pelvis. All the other viscera in a normal state.

This case, then, proved to be a perforative ulceration of the appendix, from a concretion lodged in its canal. Peritonitis circumscribed around the cæcum was the first result, and produced the adhesion in the region; afterwards the peritonitis extended to the small intestines and sigmoid flexure of the colon, and destroyed the patient. Had the peritonitis remained circumscribed, abscess would have formed, and pointed in the right lumbar region, on the outer edge of the quadratus lumborum, in which direction there was pain for some time previous to dissolution.

The swallowing of the pencil-top was a coincidence; and it not being found in the alimentary canal, we may presume that it passed away with the fæces before the perforative ulceration took place.

The diagnosis between tuphlo-enteritis, or inflammation of the cæcum, and the perforative ulceration of the appendix, was here well marked. In the latter the bowel may be acted upon by medicine, but this action is not the prelude to recovery; the symptoms

persist, notwithstanding. Whereas, in inflammation of the cæcum, the bowels are obstinately confined, as in enteritis; but, when they do act, the more violent symptoms subside, and the patient recovers.

CASE XV.

Perforative Ulceration of the Appendix Vermiformis Cæci; circumscribed Abscess; death; unusual situation of the Appendix.

Mr. H——, of Chelsea, an elderly gentleman, healthy and very corpulent, was attacked with severe spasmodic pains in the abdomen, followed by nausea and constipation. The constipation yielded to medicine in two or three days, but the nausea and occasional vomiting continued, and the pains recurred with violence. I saw him on the 19th of March 1837, in consultation with Mr. Gardener. He was very restless; at one time in bed, at another walking about the room, suffering from constant pains in the abdomen, which were exacerbated violently and frequently. He was sick, often to vomiting; the bowels acted imperfectly, and without relief; the tongue was furred, the pulse frequent, the abdomen full and flatulent; the pain was referred to a spot in the right iliac region, midway between the anterior crest of the ilium and the false ribs, where a tumour the size of an egg could be distinguished, deep-seated; the tenderness at this part was excessive.

The symptoms so resembled those arising from affections of the cæcum or appendix, that I should

have entertained no doubt of such being the nature of the case, if the locality of the pain had been in the region of the cæcum; but as it was decidedly in the region of the ascending colon, this portion of the large intestine was concluded to be the more probable seat of the disease.

Leeches, fomentations, enemata, calomel and opium, and saline aperients, prescribed.

The old gentleman had a large scrotal hernia on the right side, which we examined carefully, and finding it easily and perfectly reducible, were satisfied it had no share in producing the symptoms.

Several days passed without any improvement, and yet without any material change for the worse; the sickness, vomiting, and pain being alleviated and aggravated alternately; the bowels acting as before, yet without relieving the flatulence of the belly, or the suffering of the patient. His powers now began to sink under protracted suffering; hiccup supervened, the tongue became dry, and delirium manifested itself in the night.

The co-existence of the hernia on the same side, which, although reducible, could not be retained within the abdomen, and the persisting signs of trouble in the intestinal canal, induced us to recommend that an hospital surgeon should be called in. Accordingly Mr. Bransby Cooper was consulted, who after a strict examination, confirmed our opinion, that the hernia was not concerned. He also examined the tumour in the iliac region, which was now less perceptible than before, but there was, never-

theless, a marked circumscribed rigidity of the abdominal muscles, and excessive tenderness at the spot. Soon afterwards the abdomen suddenly became more generally tender and painful, the pain and tenderness radiating from the iliac region; and as the case proceeded I grew more convinced that there was a perforation of the intestine, which I supposed must be the ascending colon, the only gut situated in this region. Death took place about the tenth day of my attendance.

Necrotomy.—The small intestines were much distended with gas; the hernia free from strangulation, the bowel in the sac quite healthy; some traces of peritoneal inflammation, extending from the right side of the abdomen. The cæcum and colon were slit open, and found perfectly free from disease. On drawing the ascending colon towards the spine, there was discovered a circumscribed abscess, the size of an egg, seated in the peritoneum, on the outer and under side of the colon, walled in by adhesion of the outer part of the ascending colon to the corresponding portion of the peritoneum of the lateral parietes of the abdomen, the ascending colon forming the anterior and inner wall of the abscess. Proceeding in the examination, the appendix vermiformis cæci was seen to be given off from the cæcum, at its inferior part, and to take a direction first outwards and round the cæcum, then turning upwards in the direction of, and extending to the abscess, into which it opened by a perforative ulceration the size of a pea. In its course the appendix lay concealed by

the colon. No concretion or other foreign body was found, either in the appendix or in the abscess.

The situation of the abscess corresponded exactly with the spot to which the pain was referred, and in which the tumour was distinguished during life.

This unusual situation of the appendix is remarkable, and has been observed by myself in one other case only.

Its blind extremity, near which was the perforation, extended fully into the iliac region, rendering this region the focus of all the symptoms. The perforation had produced a local peritonitis, and circumscribed abscess, which, from its contact with the colon, had, by sympathy, more or less interfered with its functions, causing spasm of its muscular tunic, and consequent impediment to the action of the bowel. The extension of the peritonitis occurred two or three days before dissolution, and hastened and determined the event. The cause of the perforative ulceration of the appendix did not appear.

The varieties of disease described in the present and former memoirs consist of:

1. Inflammation, acute or sub-acute, of the cæcum, terminating quickly or slowly in resolution, or lingering on and leading to permanent organic impairment.

2. Perforative ulceration of the cæcum from within, with abscess behind the peritoneum, pointing externally in the corresponding lumbar, or inguinal region, or in both.

3. Inflammation of the appendix, spreading over the peritoneum.

4. Perforative ulceration of the appendix, with consequent universal peritonitis, ending rapidly in death; or with circumscribed peritonitis and abscess within the peritoneum, sometimes ending in death in the course of ten days, or, life being preserved, bursting eventually into the cæcum, and discharging itself by the rectum, or directing its course to the surface of the body, and pointing in the right lumbar or inguinal region. If the appendix happen to be situated anormally, then the locality of the abscess, always within the peritoneum, is determined accordingly; as also is the direction it takes, or in which it points.

On referring to the Leçons Orales of Dupuytren, and to the article of Mr. Ferrall, on Phlegmonous Tumours in the right iliac region I find that neither of these authors have spoken of the appendix. The greater number of cases detailed by Dupuytren as original phlegmonous tumours and abscesses in the right iliac fossa, appear to have been cases of perforative ulceration of the appendix, the tumours and abscesses being consequent on this perforation, and not original. The appendix, indeed, seems to have been overlooked in the necrotomy, no mention being made of it. It has also been overlooked by others, under similar circumstances; by Ferrall, Menière, Husson, and Dance, and it is the pathological error which has resulted that gives an especial interest to the subject.

A small work by Unger* is altogether silent on the perforative ulceration of the cæcum, and of the appendix, and of the consequences, abscess, peritonitis, &c.

The first publication in which I find the opinions of Dupuytren recorded, is a memoir by Husson and Dance;† the next is the Leçons Orales;‡ in both of which publications the same opinions respecting the pathology of these affections are maintained; namely, that they all are, primarily, inflammations of the cellular tissue in the right iliac fossa, which may terminate in resolution, suppuration, or sometimes in universal peritonitis.

The cases detailed in illustration in the Leçons Orales are six, of which five are examples of abscess in the right iliac fossa bursting into the cæcum, or pointing and bursting externally in the corresponding lumbar or inguinal regions: and it is far from improbable that these and other cases coming under Dupuytren's care, in his capacity of surgeon, in this stage or state of abscess, impressed him with the notion that they were primary abscesses of the cellular tissue, instead of what they really are, secondary, and consequent on perforative ulceration of the cæcum or appendix.

* Commentatio medico-practica de morbis Intestini Cæci. Auctore L. H. Unger. Lipsiæ, 1828.

† Sur quelques engorgemens inflammatoires qui se développent dans la Fosse Iliaque droite. Repertoire général. Tome iv. 1827.

‡ Des Abcès de la Fosse Iliaque Droite, Leçons Orales de Dupuytren, tome iii., p. 330. 1833. Troisième édition.

Seeing that abscesses in the right iliac fossa were frequent, while in the left they were very rare, Dupuytren endeavoured to account for this diversity by referring to the structure of the cæcum. He concluded that the contraction at the termination of the ileum in the cæcum likened it to the pylorus, and remarked that "ces rétrécissemens, en effet, en favorisant la stase des matières fécales et le séjour des corps étrangers, sont bien capables de devenir la source d'inflammation au voisinage de l'intestin."*

That this part of the intestinal canal where the dimensions vary and the organization changes is particularly liable to irritation and to disease, admits of no doubt; but that irritation of the cæcum, from the causes mentioned by Dupuytren, can produce inflammation in the neighbourhood of this intestine, and thus cause the phlegmonous tumours and abscesses in the right iliac fossa, is difficult to understand. The irritation of foreign undigested substances lodging in the cæcum will excite inflammation of the cæcum itself, not of the subcæcal cellular tissue; and the inflammation may continue, and produce permanent disease of this gut, without extending to the subcæcal cellular tissue; as is shown by the Cases III. and IV. in my first communication,† in which there was extensive chronic disease of the cæcum, without any morbid change in the subcæcal tissue. Yet Dupuytren supposes that

* Répertoire général, tome iv., p. 100.

† Med. Chir. Trans., vol. xx., p. 212-13.

even trivial irritations of the cæcum may originate inflammation and abscess in the neighbouring tissues.

These opinions of Dupuytren are adopted by Husson and Dance, and also by Menière: indeed the memoirs of these gentlemen may be said to be expositions of his doctrines. Menière endeavours to sustain these opinions by advancing, as a principle, that "phlegmasies muquenses" spread not only along a mucous membrane, but to subjacent tissues, "que l'inflammation de cette muquense (of the cæcum) peut se propager aux couches celluleuses contigues."

To this principle the pathology of inflammation is directly opposed. The rule obtains that inflammation limits itself not only to one organ, but to one tissue: the propagation of inflammation from one tissue to another, or from an organ to a neighbouring tissue, is the exception. It is the rule as established by pathology that obliges us now to recognise inflammation of the individual tissues of organs as individual diseases. We have bronchitis, pneumonia, and pleuritis, designating inflammation of the various tissues of the lungs; and muco-enteritis, proper enteritis, and sero-enteritis, designating inflammation of the various tissues of the intestinal canal.

But it is said by the authors above cited that the peculiar structure of the cæcum, viz. the absence of a peritoneal tunic at its posterior part, and its fixedness in the iliac fossa by means of cellular tissue, is the reason why inflammation propagates itself from the mucous membrane to this

tissue. Here again it may be objected, that in many cases of abscess in the iliac fossa the cæcum is found to be free from all trace of inflammation; and in other cases of extensive disease of the cæcum the subcæcal tissue remains free, uninvolved, and healthy. The principle thus laid down by Menière, that mucous inflammation spreads to subjacent tissues is not established; neither is the conclusion of Dupuytren, that irritation of the cæcum from fæcal matter or foreign bodies is capable of becoming the source of inflammation "au voisinage de l'intestin," borne out.

Dupuytren, Menière, Husson, and Dance appear to me to have confounded together the four varieties of disease above set down, and have mistaken them for a primary inflammation and abscess of the subcæcal tissue; while the abscess itself is secondary, is only a stage or symptom, and results from the perforative ulceration either of the cæcum or of the appendix.

Regarding the inflammation and abscess as primary in the right iliac fossa, Dupuytren and Menière discuss at length the causes which determine the development of inflammatory engorgements in the right iliac fossa, in preference to the left, and assign reasons deduced from the anatomy of these regions respectively. The validity of these reasons may be questioned, but I abstain from entering into the examination of them, seeing that my views on the origin of the inflammation and abscess are altogether different from theirs, and that the occurrence

of these phenomena in the right, in preference to the left iliac fossa, would be the natural consequence of perforative ulceration of the cæcum or appendix, as has already been explained. Much discussion has taken place also relative to the pathology of these tumours. Menière inquires, "De quelle nature est cette tumeur?" and concludes that it does not depend on the collection of fæcal matter, nor on psoitis and abscess, nor on abscess of the abdominal parietes: it must therefore be formed either by the intestine itself, or by the cellular tissue, and the other parts situated underneath the intestine in the right iliac fossa. In two of his Cases, VI. and VII., he is of opinion that the tumour may have depended on the cæcum; in his other Cases, that it depended on the subcæcal cellular tissue.

Differing as I do from Menière on the pathology of these diseases, and viewing them as depending altogether on the cæcum and appendix, I have no difficulty in assigning as causes of the tumour,

1st. Collection of fæcal matter in the cæcum.

2nd. The presence of any crude, undigested substance, of worms, concretions, or other foreign bodies.

3rd. Inflammation of the cæcum, resulting from the irritation of the above.

4th. Chronic disease of the cæcum, as in Cases III. and IV. of my former memoir.

5th. Abscess from perforative ulceration either of the cæcum, or of the appendix.

The diagnosis of these affections of the cæcum

and appendix is not difficult to establish, if their nature and peculiarities are kept in mind, and the symptoms inquired into with diligence and care; otherwise they may be, and have been, mistaken for idiopathic peritonitis. Dupuytren has seen them mistaken for intestinal strangulation, for hepatitis, metritis, peritonitis;* and Menière remarks, that "malgré le soin que nous avons mis à indiquer les caractères de la maladie qui fait le sujet de ce mémoire, nous ne nous dissimulons pas la possibilité d'une erreur dans le diagnostic. M. Dupuytren a vu un phlegmon iliac être pris, par un praticien distingué, pour une affection aigue du grand lobe du foie. Tout cela prouve la difficulté du diagnostic et l'extrême attention qu'il faut apporter à l'examen des symptômes."

Although, as has been observed, it is not difficult to distinguish the cæcum and appendix cases from other diseases, it is by no means an easy task to distinguish the varieties from each other; yet even this can be effected with tolerable accuracy, if we inform ourselves of the peculiarities which belong to each variety.

The inflammation of the cæcum, tuphlo-enteritis, the most frequent variety, is distinguished by the sudden attack, the patient having been in health previously; by the local signs fixed in the right iliac fossa; by the vomiting and obstinate constipation; and by all these signs being effectually relieved, or

* Leçons Orales, tome iii., p. 348.

passing entirely away as soon as a free action of the bowels can be procured. This variety is the least dangerous.

The perforative ulceration of the cæcum, which is comparatively rare, may be suspected when a patient, who has been in ill health, and labouring under bowel complaints for some time, is seized suddenly with the local signs fixed in the right iliac fossa, together with constipation and vomiting; the local signs continuing to persist in all their urgency, notwithstanding the constipation shall be overcome, and the free action of the bowels re-established. Later it will be distinguished by abscess without the peritoneum, pointing in the right groin, or in the right lumbar region, at the outer edge of the quadratus lumborum muscle; the tumour of the abscess being not unfrequently emphysematous.

Ulceration of the mucous membrane, as indicated by the bowel complaints, is a pre-existing condition of the cæcum, and invading eventually the other tunics, perforates the cæcum at its posterior part, where it is devoid of a peritoneal tunic; hence the inflammation and abscess of the sub-cæcal tissue, which give rise to all the phenomena of phlegnomous tumours, or abscesses in the right iliac fossa. Perforative ulceration of the anterior or lateral parts of the cæcum, covered by peritoneum, rarely happens. I am not acquainted with any case of this description, as proved by dissection. It would necessarily excite peritonitis, which, if circumscribed, would lead to abscess; if universal, would speedily

destroy life. These characteristics render the distinction between the perforative ulceration, and the simple ulceration of the cæcum very obvious.

The inflammation of the appendix is very rare, one case only having occurred in my experience. It was confined to the serous tunic, and presented the signs of circumscribed idiopathic peritonitis.

The perforative ulceration of the appendix is next in frequency to the inflammation of the cæcum, being certainly much more common than perforation of the cæcum. This variety may be suspected by the more or less sudden development of the local signs, always severe; by their being fixed in the right iliac fossa, and not preceded by bowel complaints, or ill health; by the supervention of vomiting and constipation, the constipation yielding readily to medicine, yet, having yielded, no amendment following; by the great tension in the ilio-inguinal region, there being always a circumscribed peritonitis and abscess within the peritoneum; by the sympathetic tenderness of the whole abdomen; and, subsequently, by the occurrence of a diarrhœa, and a discharge of pus by the rectum, followed by subsidence of the tumour, and amelioration of all the symptoms; or, by the pointing of the abscess in the form of an emphysematous tumour in the lumbar-inguinal, or ilio-inguinal regions.

The peritonitis, excited at the moment of the perforation of the appendix, will not unfrequently spread rapidly and universally over the peritoneum, and destroy life in from twelve to twenty-four hours.

The absolute perforation of the appendix is preceded by ulceration of the mucous membrane of some standing not resulting from disease of the intestinal canal, but produced by the accidental presence and infraction of some small foreign body: hence bowel complaints do not usually precede the perforation of the appendix.

The perforation of the appendix has many symptoms in common with the perforation of the cæcum. The perforation of the cæcum, however, is generally preceded for weeks or months by bowel complaints, indicating ulceration of the mucous membrane; while the perforation of the appendix is not preceded by such bowel complaints; a difference in the state of the canal prior to the occurrence of the perforation which aids materially in establishing the diagnosis.

It was my intention to present, in this place, an analysis of the cæcum and appendix cases on record, with a view to show the comparative frequency of the varieties before described, and other particulars. This intention I feel obliged to forego, owing to the difficulty of distinguishing with accuracy one variety from another; the greater part of the cases having been published as phlegmonous tumours, and not containing an account of the state of the appendix; an omission which would leave me under the necessity of conjecturing, from the data of the cases, what was the particular nature of each. Such a proceeding would necessarily be subject to disapproval, though by it one may nevertheless arrive at a pretty

correct estimate. I must therefore limit the analysis to cases which have occurred within my own knowledge.

Analysis of Twenty-one Cases.

Mortality: 13 recovered; 8 died.

Character: 19 acute; 2 chronic.

Varieties: 11 were inflammation of the cæcum—all recovered.

2 were chronic disease of the cæcum—both died.

1 was ulcerative perforation of the cæcum from within, with abscess externally—recovered.

1 was inflammation of the appendix, with circumscribed peritonitis—died.

6 were ulcerative perforation of the appendix—five died, one recovered.

Of the five fatal cases of perforative ulceration of the appendix, one died of diffuse peritonitis in about sixty hours; one of peritonitis, and circumscribed abscess in the peritoneum, in nine days; one of circumscribed peritonitis, and abscess in the peritoneum, in twelve days; one of circumscribed abscess in the peritoneum, in four weeks; and one of abscess in the peritoneum, pointing in the right iliolumbar region, in eleven days.

The one which recovered was a circumscribed abscess in the peritoneum, bursting into the cæcum.

Age,—Two under ten years of age; seven between ten and twenty; three between twenty and

thirty; six between thirty and fifty; three between fifty and seventy.

Sex,—Sixteen were males; five were females.

Occupation,—Six were gentlemen; one was a coachman; one a farrier; five were boys having no particular occupation; three were destitute; five were females having no particular occupation.

Season,—In the autumn and beginning of winter, more frequently.

Dupuytren, from the analysis of sixteen cases, infers that they occur at the end of summer and beginning of winter more frequently; that age has an incontestible influence, eleven out of the sixteen having been under thirty years of age; that men are more liable than women; and that a greater liability applies to trades, as painters, colour-grinders, and turners in copper.

The inferences from this analysis are borne out by the foregoing in so far as relates to sex and season. They differ in some degree as relates to age; and entirely as relates to the liability of particular trades.

In the twenty-one cases the age varied from six to seventy years; the number under thirty being twelve, viz., four-sevenths of the whole; while Dupuytren's rather exceed two-thirds. The greater susceptibility of the alimentary canal in young persons would predispose them to inflammation of the cæcum, from the irritation of crude, undigested substances, and give a preponderance of cases under

the middle age. The liability of particular trades I hold to be a fallacious inference; the twenty-one cases having occurred in persons wholly unconnected with trade. Indeed, the causes being accidental, and having no relation to occupation, leave no ground for the supposition that the kind of trade can be instrumental in producing the various affections of the cæcum and appendix.

CASE

OF

CARDITIS.

By THOMAS SALTER, Esq., F.L.S.

OF POOLE.

READ JANUARY 8TH, 1839.

JUDGING from the records of medicine, genuine carditis, or inflammation of the muscular substance of the heart, is one of the rarest of human diseases: from this view I would, however, except abscess and ulceration of the heart, which have not been unfrequently observed. The older pathologists evidently did not discriminate carditis from pericarditis; and our celebrated countryman, Dr. Baillie,* dismisses the subject with little more than a page; he speaks, indeed, of having seen one case of inflammation of the muscular substance of the heart, but gives no description of the appearances; his engravings, in reference to this subject, are representations of pericarditis only.

It does not appear that either Corvisart or Laennec ever saw an unmixed case of carditis; nor does Andral, either in his Pathological Anatomy, or in his Clinique Medical, give a single instance of the disease. In a little work, published in the year

* Morbid Anatomy, 2nd ed. p. 19.

1808 by Dr. Davis, on Carditis, there are several interesting cases of pericarditis, but not one of true inflammation of the heart. In the first volume of the Transactions of the Medical and Chirurgical Society of Edinburgh, will be found a valuable communication from the pen of Dr. Abercrombie on the Pathology of the Heart; but it contains no case of pure carditis, neither does the work of his distinguished countryman, the late Mr. Allan Burns, on Diseases of the Heart, furnish us with a single example of this lesion. The clearest case of carditis that has hitherto been published, is that given by Mr. Stanley, in the seventh volume of this Society's Transactions: that too was accompanied with unequivocal evidence of the existence of inflammation of the pericardium; but when the relation which the pericardium bears to the muscular substance of the heart is considered, it is, perhaps, difficult to conceive, that in inflammation of the heart the pericardium should entirely escape.

The following case, which I now venture to lay before the Royal Medical and Chirurgical Society, will, I think, be allowed to have been an instance of carditis even less mixed than that described by Mr. Stanley.

N. P. Sheppard, about 50 years of age, tall and well formed, and of a fair complexion, by trade a glover, but formerly a dragoon, applied for advice March 16th, 1834. He complained of uneasy sensations in the region of the stomach, and under the sternum, increased by any sort of exertion. The appetite was good, and the pain not influenced by

eating; bowels regular; tongue clean at the edges, but the centre and back parts covered with a thin white coating; pulse natural; countenance pale. On applying the ear to the cardiac region nothing abnormal was discovered.

He states that the symptoms were first observed about six weeks since, whilst walking; that the pain was then at the lower part of the chest, inclining to the left side, and though it did not continue long was remarkably severe, producing faintness, and a cold perspiration. About a week subsequent to this he had another severe paroxysm, which occurred immediately after a walk of three miles into the country. The attacks are becoming more frequent, though not always so severe as the first; they now occur occasionally whilst sitting, and even lifting the arm sometimes brings on the pain. Accompanying the pain in the chest there is frequently considerable uneasiness about the middle of the left upper arm. There is no cough or sign of any pulmonary affection. He complains a good deal of flatulence, and says he is made worse by the use of beer. He was directed to take some pills with pil. hydrar. and ext. colocynth every other night, and twice in the day a portion of a mixture containing sulphate of magnesia and carbonate of soda; from the use of these remedies, and a strict attention to regimen, he experienced considerable relief; till early in the morning on Saturday the 22nd, when I was hastily sent for to see the patient at his house, he having previously called on me.

I found him sitting up in bed, being, from great oppression and distress in his breathing, unable to lie down. He placed his hand over the sternum, and said with great earnestness, "it all lies here." The pain was not lancinating, but of a dull heavy description; his face was pale, features sharp, and the expression anxious; and he said he felt as if he could not possibly live; pulse 80 and regular; heat of the skin temperate; pain in a slight degree increased by deep breathing; no tenderness at the scrobiculus cordis; feels some relief by raising wind from the stomach; action of the heart seems natural; chest sounds well on percussion, and the respiratory murmur is good.

He was bled to ten ounces, and had a blister applied over the sternum: in the evening there was no remission of the symptoms; his sufferings continuing distressingly severe, and the seat and character of the pain remained unchanged; the pulse had risen in frequency to 120, and was small and weak; on inspiring deeply the pain was but in a slight degree increased; pressure on the intercostal spaces did not produce pain. The respiratory murmur was heard on both sides of the chest, but the anguish of the patient was so great, that it would have been extremely difficult, if not impossible, to have made any very satisfactory local examinations. His sufferings and distress in breathing were at this time so great that he did not appear able to give any precise or intelligible account of his feelings. He was directed to take one grain of opium and four of calomel every three hours.

Sunday 23rd.—I was called early this morning to visit the patient; the report of the attendants was very unfavourable; he had passed a sleepless night, with restlessness and anxiety almost indescribable, frequently getting in and out of bed, and once dressing himself. He has vomited a large quantity of fluid tinged with green bile. He is still constantly obliged to observe the erect position; pulse 130, and so feeble as scarcely to be felt; sounds of the heart just distinguishable by the stethoscope; surface of the body cool; bowels open; urine in moderate quantity, with sediment. The pain under the sternum is less complained of, but the oppression of the breathing and the anxiety are truly distressing to witness.

Evening.—The symptoms are nearly the same as those observed in the morning, with the exception that he now complains of pain on the upper and left side of the chest, and beneath the clavicle.

Monday morning, 24th.—No sleep during the night; the restlessness, anxiety, and oppression of the chest remain; pulse not to be felt at the wrist; the hands, feet, and legs are cold; the patient continued to suffer greatly during the day, but gradually becoming weaker, he died at eleven o'clock at night, about 65 hours after the accession of the acute symptoms. His mind was collected, and wholly undisturbed during the entire period of his illness.

Sectio Cadaveris.—My late pupil, Mr. White, now graduating at the University of Edinburgh, assisted me in the examination of the body.

As might have been supposed, from the rapid course of the disease, the corpse exhibited no appearances of emaciation. The front of the chest sounded on percussion well at every part. The sternum being raised, the right lung collapsed, and had a natural aspect; but the opposing pleura on the opposite side being almost universally adherent from former attacks of inflammation, the left lung did not collapse. In the right pleural cavity there was more than half a pint of serous fluid. Nearly the whole of the left lung was in a state of considerable engorgement, resembling the first stage of pneumonia; it was crepitant, but from the cut surfaces escaped a large quantity of sero-sanguineous fluid, and from one of the cut bronchial tubes a clear fluid was observed to flow, which by pressure was also forced out of the trachea. The capillary and other vessels on the bag of the pericardium were distended with red blood, especially on the left side, exhibiting a beautiful vascularity. That portion of the membrane investing the substance of the heart showed also, by its unusual vascularity, striking evidence of having suffered from inflammation; this, too, was mostly on the left side, that portion covering the left ventricle being its chief seat; but the part of the pericardium which had sustained the most intense vascular disturbance, was that which lies on, and is attached to, the diaphragm. Here there was not only a distended state of the capillary and larger vessels, but numerous ecchymosed spots and blotches resembling those observed

on the skin in purpura hæmorrhagica. There was no lymphatic, serous, or purulent effusion into the pericardial sac. The heart was somewhat larger than natural, its substance of moderate firmness; large coagula were found in all the cavities; some of these were quite white, others deprived of their red colour, and of a yellowish hue, and adhering with great tenacity to the internal parietes, whilst some portions of the coagula were dark on the outside and bleached within. There were no signs of disease in the lining membrane of the heart or valves. In the ascending aorta there were the appearances of commencing ossification. The great deviation from the normal condition of the heart was, however, found to be in the muscular substance of the left ventricle: excepting a small portion of a few lines in thickness on either surface, the left ventricle had entirely lost its muscular colour; it was of a lightish yellow hue, but still preserving the fibrous character of muscle. From all the cut surfaces of the various sections which were made, could be scraped purulent matter. In some parts absorption had taken place, leaving small cavities in the muscular substance, varying from the size of a pin's head to that of a small pea; these were all filled with pus. The stomach was large and flaccid, and contained a considerable quantity of fluid. The mucous membrane of the pyloric half was of a dingy red colour, from a spotted vascularity. The liver appeared quite healthy. The jejunum was inflamed, both in its peritoneal and mucous coats, for the greater portion

of its length. There were no other diseased appearances.

REMARKS.

From a review of the symptoms and progress of this case to its fatal termination, it would, I think, appear, that a chronic inflammation of the muscular substance of the left ventricle of the heart, constituted the primary disease, and that it no doubt existed at the time the first symptoms occurred; this supposition, if correct, explains the effect of bodily exertion, even of the most trifling kind, occasioning so much distress. It is evident that the left ventricle, from the unnatural state of its muscular fibres, must have been unequal to the task of propelling more blood than the state of perfect quiescence required. The accession of the violent symptoms manifested on Saturday morning, (23rd,) may have arisen from the inflammation then assuming an acute form, and extending to the pericardium. It was not until the Sunday evening, (thirty hours afterwards,) that the patient complained of pain in any other situation than the region of the heart, and this, as has been before stated, was at the upper part of the chest, from just below the clavicle extending downward to the sixth rib, immediately over that portion of the left lung found on dissection in a state of inflammatory engorgement. The pneumonia seems to have been the last link in the chain of morbid action; a consecutive disease, produced by the diffi-

culty in transmitting the blood through the heart, and also from the disturbed state of the vital powers generally; but more especially of those of the central organ of the circulation, with the healthy performance of whose functions the lungs are so intimately associated. The progress of the case was so rapid after the occurrence of the acute symptoms, that but little time was allowed for the action of remedies; the state of the pulse, and the depression of the vital energies, on the evening of the first day, were such as to contra-indicate further depletion; the counter irritation from the blister failed to afford relief; the only hope that remained was from the use of calomel and opium; and though these were unremittingly given, no constitutional or beneficial influence resulted. Had the exact nature of the complaint been known when the patient first sought assistance, on the 16th of March, it is more than probable, that blood-letting and counter irritants, aided by the constitutional operation of mercury, might have led to a different issue: but the disease at that time was supposed to be functional angina, the sympathetic offspring of gastric and hepatic disorder, not unfrequently witnessed by practical men.* The diagnosis in these cases is

* I knew a gentleman who suffered severely from functional angina pectoris for several years. He had the advice of more than one eminent physician, who considered his symptoms to arise from ossification of the coronary arteries; he, however, eventually lost his complaint by leaving off meat suppers, at the suggestion of Mr. Abernethy.

often confessedly difficult among the general symptoms; the one most decidedly pathognomonic of organic change, is breathlessness on exertion. This symptom was certainly well marked in the case here narrated; but it must also be observed, that it likewise occurred at other times, and when no exertion had been made; in cases in which there are long intervals between the paroxysms, and which are mostly of a chronic kind, there is less difficulty in the discrimination.

NOTICES

OF THE

EFFECTS OF LEAD

UPON

THE SYSTEM.

By JAMES ALDERSON, M.A. & M.D.

PHYSICIAN TO THE HULL GENERAL INFIRMARY,

FELLOW OF THE ROYAL COLLEGE OF PHYSICIANS, LONDON.

READ JANUARY 8TH, 1839.

Amongst the numerous cases of colic and of paralysis, the consequence of the absorption of lead, which have fallen under my care in the General Hospital at this place, two cases have occurred with paralysis of the nerves of vision, a form of the disease which I have nowhere seen noticed by authors who have treated of the effects of lead on the system; as the plan of treatment was in both cases successful, I venture to hope that the communication of them to the Society will not be thought uninteresting.

The more usual seat of paralysis from lead, which is apparent to observation, is well known to be in the nerves supplying the flexors and extensors of the

wrists and arms, especially the extensors; and the plan adopted by Dr. Pemberton, of supplying splints on which to keep the hands and fingers extended, by which the continued extension of the extensor muscles is relieved, and their suspended power recovered, has often been tried with success, both alone and in combination with internal remedies. It is upon the same principle that I have adopted a remedial plan to restore the lost powers of the nerves of vision.

The action of light is the proper stimulus of the retina, and its continued action whilst the nervous expansion is paralyzed, is precisely similar to the continued extension of the extensor muscles of the arm and hand; as in this latter case, relieving the muscles from their continued extension by means of splints, has been found to restore their suspended power, so it was, by analogy, to be supposed, that by removing the stimulus of light altogether from the eye, the power of vision would probably be regained.

With this view a bandage was directed to be applied over the eyes, and constantly worn day and night, so as to preclude the possibility of any light acting upon the nerves of vision. The practice was followed in both cases with success.

We see a precisely similar effect arising from the application of the same principle, in an over distended bladder. The over distension takes away the power of contraction; whilst by emptying the viscus of its contents, or in some cases only by keeping it

empty, the contractile power of the organ is restored.

I proceed to give a short detail of the cases to which I have alluded.

December 27, 1833.—Elizabeth Clayton, aged 25 years, single woman, was admitted into the Hull General Infirmary. States that she has worked for seven or eight years in the lead works, and has never before been attacked with paralysis. She first perceived the approach of paralysis about six weeks ago. The hands were the first to lose their power; after about three weeks her eyesight began to be defective. The sight is at this time completely lost. The pupils are somewhat dilated.* Her legs are also affected with paralysis, but she scarcely knows how or when they became affected. She states that she has done all sorts of work in the lead works, but is of opinion that what is called "picking,"† is the

* In the instance of loss of sight, is the lesion in the optic expansion alone? Or is there also paralysis of the nerves supplying the iris? The effect of this latter, independently of the former, would be *indistinctness* of vision, in consequence of the admission of too much light to the retina, and also of the indirect rays.

† When lead, in its blue metallic form, is first placed in the earthen pots, it is rolled up or cast in forms, and placed over vinegar; it then remains for some time, (six or eight weeks,) embedded in manure and bark, which keeps it at a proper temperature for the action of the vapour of the vinegar on the metal. When first opened out for work or separation, there arises a heated vapour, which is thought by those employed in the works to be very pernicious. The pots are then taken out of the beds and carried to

most deleterious. The girls of the works are employed on this duty every other week only. The following medicines were ordered for her: A drachm of sulphate of magnesia, with two minims of laudanum, in an ounce of the compound infusion of roses, every four hours. Ten grains of the compound ipecacuanha powder at bed-time and a stimulating liniment to the neck and spine, and a generous diet.

She was in the house three weeks on this plan, without any improvement in the vision, though during this time her other paralytic symptoms were perceptibly improving. With a view to take off the stimulus of light from the nerves of vision, a bandage was then directed to be applied over the eyes, so as to exclude the light altogether. The bandage to be worn day and night.

On Feb. 14, 1834, the report is, "improves daily," can distinguish objects, but not clearly.

Feb. 18. Quinine ordered.

Eye-sight described by the patient as "rather thick." Her eyes vary much, sometimes "quite light." Can read large print,—made out-patient.

a table, to be "picked over." The lead is then unrolled, or passed between rollers and crushed, to force off the encrusted carbonate, or white lead of commerce. That which is white is separated from the metallic part, and it is this separation, or "picking," as it is called, which is found to be so pernicious. During the mechanical separation, by crushing, the finer portions of the carbonate will be suspended in the atmosphere, and breathed by the girls whilst employed in the work.

Soon after this she was discharged from the hospital, perfectly cured.

On June 10, 1835, Elizabeth Dyson, aged 18 years, was admitted into the Hull General Infirmary, suffering from complete loss of sight, with paralysis of the hands. States that she has worked nine months in the lead works, and has had colic several times; that castor oil was always sufficient, in her attacks of colic, to remove the complaint.

A bandage, as before, was ordered over the eyes, and to be kept strictly applied, so as to exclude all light; and the same plan of treatment was adopted as in the last case.

June 24th. Some power of vision returning; better in her other paralytic symptoms.

July 8th. Eye-sight quite restored; ordered quinine.

July 15th. Discharged from the hospital cured.

I may be allowed to add, that several cases of paralysis, without loss of vision, and numerous cases of colic, have also within the last nine years fallen under my care, both in the hospital and out of it. Those of paralysis, without colic, I have found, for the most part, hitherto to yield to the compound infusion of roses, with salts and laudanum. Whilst those of acute colic always give way to a steady perseverence in drastic purgatives, assisted by purgative injections.

In the milder cases, the old remedy, calomel, colocynth, and opium, in repeated doses, answers ad-

mirably; whilst in the more severe cases, croton oil frequently repeated, until relief be obtained from the bowels, is more efficacious than any other remedy with which I am acquainted. The form and dose which in my experience is found to answer best, is two drops of the oil, with ten grains of magnesia, a drachm of mucilage, and an ounce of cinnamon water, every two or three hours.

I willingly bear testimony to the excellence of this remedy in cases which resist the milder and more common treatment, in overcoming what was formerly supposed to be spasm in the bowel; but which we now believe, reasoning analogically from those parts which we have the means of observing, to arise from paralysis of portions of the intestine.

This state of the intestine, in the more severe cases, requires the most powerful drastics in order to induce the bowel to empty itself of its contents. It may admit of doubt in what way the effect is produced by drastics, whether as a stimulus to the paralysed part of the intestine, or to the more healthy part of it, by which so much increased action is induced, as to carry the contents of the bowel through and beyond the paralysed part. Certain it is, that the most powerful drastics are required, and are well borne by the patient.

Cases of Paralysis from the unsuspected absorption of Lead, in consequence of drinking rain water, kept in lead cisterns.

On the 18th of July 1837, I was requested by Mr. Craven to visit, in consultation with him, Mr.

Thackray, aged sixty-three years, residing in West Parade, near Hull, one of the Elder Brethren of the Trinity House of this port.

I found him labouring under paralysis of the upper extremities, and partial paralysis of the lower. The hands, with the palms turned inwards, hung by his sides, and rather forward, perfectly powerless, rather swollen, and of a lived hue. He had no power of moving the fore arm, nor of rising from his chair without assistance. When he walked to his bedroom, he required the assistance of a servant on each side of him, and then his knees bent under him, and his gait was tottering. His voice was a good deal altered, and the control over the tones of the voice much impaired. His countenance was blanched, but not sallow; the functions of the brain, as an organ of intellect, not interfered with. He complained of great pain in the lower part of the body, accompanied by costiveness, and of pain across the legs and arms. He would frequently shed tears from slight causes at our visit to him, as we constantly see in patients paralytic from disease and lesion in the arterial system.

I learnt from Mr. Craven, that his bowels acted only every three or four days, and then only in consequence of having taken active medicine; that, in a former attendance, eighteen months previously to my being called to attend him, Mr. Thackray had an epileptic seizure. During the fit he fell out of bed, and dislocated the left shoulder, since which period he has not been affected with epilepsy.

The fact, that the sister of Mr. Thackray's late wife, who lived in the house with him, was last year attacked with paralytic symptoms, precisely similar to those of her brother-in-law, excited my attention, as a remarkable coincidence. These had supervened upon a debilitated constitution, which had for some years shown signs of giving way. She died paralytic, without any cause of the paralytic symptoms having been made out.

As there was no relationship by blood between them, it appeared to me more than probable, that some common agent existed as the cause of the symptoms in both.

On inquiry, it was ascertained that the water used by the family, and which was supposed by them to be more pure than any supplied to the town, was rain-water, collected from the top of the house by means of lead gutters, and received into a cistern lined with lead. It was filtered for use, and had a sweetish taste, which had been often remarked by the servants. On testing the water in conjunction with Mr. Robert Craven, agreeably to the recommendation of Dr. A. T. Thompson, we obtained distinct evidence of the presence of lead.

It was now deemed advisable by us to call in to our assistance Mr. Pearsall, a most able chemist, to determine the precise condition in which the lead existed, and the proportion contained in the water.

On examining the sides of the cistern, in conjunction with Mr. Pearsall, and scraping them with the nail, the white carbonate of lead was abundantly

manifest, especially in the angles of the cistern, where the soldering had, probably by galvanic action, assisted and expedited the change. Efflorescence was here distinctly to be seen.

It was now pretty evident that the source of the paralytic symptoms was lead in the water; and, in consequence, Mr. Thackray was immediately put on a similar plan to the cases which I have already detailed, viz., compound infusion of roses, with sulphate of magnesia and laudanum, and a generous diet allowed, with stimulus in moderation. Subsequently quinine, strychnine, frictions, and electricity.

I am happy to have it in my power to say, that Mr. Thackray is now able to walk almost any distance, to use his arms pretty well, though he has not regained, and probably never will regain, complete power over the wrists and fingers.

He is now able to enjoy life, which was previously becoming a burden to him; and he is very grateful for the providential discovery of lead in the water used by the family, and which is now entirely discarded for culinary purposes.

Many of the usual symptoms were manifested in the servants, but in a minor degree; they have been, more or less, tormented by colicky pains, and by constipation; but not having resided for any long period subjected to the influence of the water, it was not to be expected that they would be affected with the more chronic symptoms, as paralysis, &c.

It is worthy of notice, that it was always re-

marked that when Mrs. Martin (Mr. Thackray's sister-in-law) went on a visit into Lincolnshire to her native air, she recovered wonderfully from her paralytic symptoms, and came home much invigorated and restored; but on her return to Hull, the symptoms of paralysis soon returned. The action of lead on the system was not at that time suspected.

This fact accords, however, with our observations on the general action of this poison in the system in those whose pursuits and avocations lead them to handle it, or to be amongst it. In painters we witness an aggravation of symptoms on a return to their accustomed employment; even the wearing of unclean apparel has been supposed to re-induce the disease in those who have recently suffered from it.

This is also similar to the specific action of other metals on the system. It is well known that a single dose of mercury is sometimes sufficient to re-establish ptyalism in an individual recently affected constitutionally by the metal.

NOTE, by Mr. Pearsall.

A CHEMICAL examination of the bottles of water submitted to me having fully shown lead to be present by the ordinary tests, and having adopted Dr. Christison's view of the action of pure water upon lead, the next question of importance was the amount of lead in the water. In the course of ex-

periments, the following case occurred, which will at once show the uncertainty of investigation, and afford a strong caution against hasty observations. I found by tests that the quantity of lead was subject to variation; and on one occasion I went to the cistern in company with Dr. Alderson. The rain-water in it appeared clear and transparent; one bottle was filled; then, as the cistern was known to be dirty, the sediment was agitated with the water, and a bottle filled with the now muddy fluid. On the following day the waters were tested for lead; the bright water gave abundant precipitate; the other water poured from the subsidence was clear, and did not exhibit a trace of lead; but the black sediment contained this metal in large quantity, for the deposit, boiled with pure nitric acid, and the excess of acid driven off or neutralized, the filtered fluid was found to be a strong solution of a salt of lead.

Most important consequences are evident from this fact: first, that the quantity of lead may and does vary with the substances accidentally or mechanically present in the water; and thus a family may be subjected to the deleterious effects of lead in water; and then the lead may be suddenly removed by agitation, as by a shower of rain; and, next, that water may be examined and pronounced pure and free from this metal, and the cisterns unacted upon, when indeed the waters may generally be charged with lead to a dangerous extent when used for ordinary purposes. Hence in all cases it

is absolutely requisite that the deposited matter in cisterns and tanks be examined, by digesting the sediment with pure nitric acid, or some other acid of known purity, capable of forming soluble salts of lead, and determining the presence or absence of lead by the usual tests of sulphuretted hydrogen, &c., &c. The quantity of lead obtained by sediment from clear water which showed abundance of lead before agitation, I found, from one gallon of the muddy fluid a precipitate equal to about 13·866 grains of metallic lead.

I am aware that there is the received opinion that the lead is mechanically suspended; and indeed water with lead in this peculiar state cannot be passed through a paper filter without being deprived of nearly all the lead; a second filtration will sometimes remove nearly every trace; but if sulphuretted hydrogen be added to the filter, it will afford decisive evidence of lead being detained upon the surface of the paper. I am inclined to believe that the lead is held in solution by chemical affinities; but these are so feeble, that foreign bodies are capable of destroying the combination by minute causes, whose actions, although obscure at present, yet are well known by producing similar effects. I may mention, that undoubted chemical compounds are known to have their energetic affinities destroyed, and new substances formed, by the mere act of filtration through organic bodies, such as paper. Manganesic acid, oxy water, are among the well-

known instances to be found in the works of the most eminent chemists of the present day.

During my experiments, I have found that bright waters impregnated with lead, retained it after being kept for fourteen months in bottles, which were occasionally opened, the tests seemed to show but little difference in the quantity; nearly the whole of this lead could be removed by agitation, with carbonaceous and earthy matters.

T. J. PEARSALL.

NOTICES

OF THE

OCCURRENCES AT

THE SMALL-POX HOSPITAL,

LONDON,

DURING THE YEAR 1838.

By GEORGE GREGORY, Esq., M.D.

PHYSICIAN TO THE SMALL-POX HOSPITAL.

Communicated by JAMES M. ARNOTT, Esq.

READ JANUARY 8TH, 1839.

The total number of patients admitted into the Small-pox Hospital during the year 1838 was 712—416 males, and 296 females.

Of them 17 had diseases not variolous (such as lichen, spurious measles, &c.)

Total, having small-pox in some of its forms, 695.

Of them there died 187, being at the rate of 27 per centum.

Of these 695 there had been vaccinated in early life 302, of whom 30 died, being at the rate of 10 per cent.

The remainder, 393, were unvaccinated, and of them 157 died, being at the rate of 40 per centum.

No patient applied for admission having previously been *inoculated!*

In 1781 the admissions were 646; of them 257 died, being in the ratio of 40 per cent., the exact proportion in which the unvaccinated died during the year just passed.

Had the like rate of mortality extended to all the patients admitted, the total deaths would have been 277.

90 lives therefore were saved in 1838, more than in 1781; and I think there can be no question that, while some portion of this may be attributed to the improved state of the present Hospital, compared to that in Cold-bath Fields, which received casual patients in 1781, the largest share is due to *vaccination*.

Even at this time the arrangements at the Hospital are wholly inadequate for the numbers. In the months of March and April typhus fever broke out in the wards in consequence of overcrowding, proving fatal to 12 persons, of whom 6 had been vaccinated, and 6 had not.

This would reduce the deaths by small-pox after vaccination to 24, being in the ratio of 8 per cent.

Of the 302 patients received with small-pox after prior vaccination, 97 had the disorder in that extremely mild form, commonly called "*varicelloid.*"

The remainder (205) had it in variable degrees of severity, from the most distinct mild, through the several grades of semiconfluent modified and semiconfluent unmodified, to the confluent modified, simple confluent, and confluent malignant.

Great difficulties were necessarily experienced in determining who had been really vaccinated, of those who assumed to have undergone that process. The cicatrix was our chief guide; but this often failed us, from the swollen and pock-covered condition of the arm at the time of the patient's admission.

The same difficulty occurred occasionally with those who professed never to have undergone vaccination. The highly modified aspect of the disease in many of them afforded strong presumption of prior vaccination, which the appearances of the arm gave some countenance to.

The errors on the one side may fairly be taken as balancing those on the other.

The average age at which the patients were received, both the vaccinated and the wholly unprotected, was 21.

79 children were received *under ten years of age*, unvaccinated, of whom 31 died; 5 only at the same age, vaccinated, of whom none died.

The earliest age at which any *vaccinated* person was received was eight years.

The earliest age at which death took place after prior vaccination was fifteen years.

Between ten and twenty years of age, 246 *unvaccinated* were received, of whom 90 died.

Between twenty and forty years of age, 181 *unvaccinated* were received, of whom 86, or nearly one-half, died.

The increased severity of the disease, as life advances, is proved in like manner to hold true in

respect to the vaccinated. Between fifteen and twenty-nine years of age (inclusive) 92 vaccinated persons were admitted, of whom only 6 died. (Say 6 per cent.)

Between twenty and thirty (inclusive) 163 vaccinated persons were admitted, of whom 23 died, being 15 per centum.

The great bulk of the vaccinated cases were between the ages of eighteen and twenty-four.

13 were received having small-pox after vaccination, between the ages of thirty-one and thirty-five, of whom one died.

4 were received above thirty-five years of age, vaccinated, all of whom survived.

The greater number of the vaccinated underwent that process in early infancy, and but a few at a period of life when they could remember the event.

By far the larger proportion were vaccinated in the country, and exhibited only *one cicatrix* on the arm.

London, Jan. 7th, 1839.

Return of the Ages of the several Persons admitted into the Small-pox Hospital in 1838.

Ages of Patients having Small-pox.	UNPROTECTED.		VACCINATED.	
	Admitted.	Died.	Admitted.	Died.
Under 5 years	42	20	0	0
From 5 to 9	37	11	5	0
From 10 to 14.....	30	8	25	0
From 15 to 19.....	103	32	92	6
From 20 to 24.....	113	50	108	15
From 25 to 30.....	45	23	55	8
From 31 to 35.....	12	7	13	1
Above 35 years.....	11	6	4	0
Total	393	157	302	30*

* Of these 6 died of superadded typhus.

CASE

OF

FRACTURE

OF THE

CORACOID PROCESS OF THE SCAPULA,

WITH

PARTIAL DISLOCATION OF THE HUMERUS FORWARDS,

AND

FRACTURE OF THE ACROMION PROCESS OF THE CLAVICLE.

By JOHN F. SOUTH,

ASSISTANT SURGEON TO ST. THOMAS'S HOSPITAL.

READ FEBRUARY 12TH, 1839.

I TAKE the opportunity of laying before the society the account of an accident, the occurrence of which has been doubted, and a dissection of which has not, so far at least as I am aware, been hitherto made.

Richard White, aged 58, by trade a painter, was admitted into St. Thomas's Hospital on the 12th of April 1838, at 7 o'clock in the evening.

He was a thin spare man, of loose fibre, and of moderately temperate habits, though he had formerly lived freely; and whilst at work on a scaffold

about thirty feet high, in stepping back fell from it to the ground, about an hour since.

I saw him very soon after his admission, after having been brought four miles in a cart; his extremities were then cold, and the pulse slow and labouring. Some wine was given, and hot bottles having been applied to his feet, after a little time he revived sufficiently to bear an examination.

It was stated that he had fallen directly on his head; and just opposite the middle of the coronal suture was a slight skin wound, with some surrounding contusion, but I could discover neither fracture nor depression:—his left eyelids were much swollen and ecchymosed, and from the left ear blood streamed freely; but he had no symptom of cerebral damage, was perfectly sensible, and answered readily and reasonably.

Upon the back of the left elbow was an oblique wound of the skin, about an inch in length, opening the joint, and exposing the inner side of the ulnar pulley of the humerus between the broken extremities of the olecranon, the upper portion of which had been drawn up about an inch.

The arm hung closely to the side, and at first I did not observe any injury of the shoulder; but being informed that the surgeon who had sent him to the hospital thought there was dislocation at that joint, I examined it more carefully, and on rotating the arm, felt crepitus, which I considered to arise from the motions of the broken ulnar being transferred to the humerus. However, not being satisfied on this

point, I fixed the olecranon, and then looking more closely at the shoulder, observed a depression below and behind the acromion, which led me to suppose some displacement of the head of the humerus or fracture of the neck of the scapula, but still the roundness of the shoulder was not lost. I then put my hand on the shoulder, and endeavoured to grasp the neck of the scapula with my thumb and finger (the former being in the axilla), and commenced gentle rotation of the arm, when immediately and unexpectedly I felt the head of the humerus move backwards, and the appearance of pit ceased. I then began to arrange the elbow, and whilst doing this the humerus again slipped out, the same appearance of depression behind it and below and behind the acromion was reproduced; and I also observed there was preternatural prominence and roundness of the front of the shoulder. I therefore supposed it to be dislocation under the clavicle, of the same kind, though not to the same extent, as the so-called dislocation under the pectoral muscle, but which is really rather under the inner edge of the deltoid than under the pectoral muscle.

For the fracture at the elbow joint a long well-padded splint was placed on the front of the limb, to which the fore-arm was connected nearly as high as the elbow by another, and the upper arm in a similar manner, but less tightly, from a little above the joint nearly to the axilla. The edges of the wound were brought together with two adhesive straps, and the plaister varnished with sealing-wax, after Mr. Aber-

nethy's plan, so as to allow the application of an evaporating lotion without the straps being loosened.

The dislocated head of the humerus was now again replaced, merely by lifting the neck outwards with the thumb and rotating the arm: its return was this time indicated by a grating noise, which was heard by the bystanders. A large pad of tow was put in the armpit, and confined there by a bandage tied upon the opposite side of the neck, and a second bandage passed round the belly, and including the fore-arm, brought the band near to the trunk, whilst the head of the humerus was kept up by the pad in the axilla.

April 13th, morning.—Reaction did not come on till late last evening; he then became warm, and has had a tolerable night. The upper arm slightly swollen, and the shoulder rather tender when touched.

April 14th, afternoon.—He has had a comfortable night—tongue clean, pulse 100, and small. The upper arm having now become more swollen, and the bandage around it very tight, the splint at the same time having slipped from the front to the inside of the arm, both it and the splint were removed, and another splint slightly bent opposite the elbow placed along the front of the fore-arm and extending about four inches above the elbow, keeping the fore-arm between pronation and supination with the thumb upwards; a bandage was then passed around the fore-arm nearly as high as the elbow, but not continued above it.

April 16th, morning.—Has had a very bad night, in consequence of cough and vomiting, and is much exhausted; complains of pain at the pit of the stomach: pulse 102, small and weak—bowels not moved since the day before yesterday. I desired he should have an injection of senna and sulphate of magnesia, and a mustard poultice to the pit of the stomach immediately.

Early in the afternoon vomiting recurred, for which he was ordered acid. hydrocyan. mij ex aquâ sextis horis.

11 P.M.—The vomiting has continued; pulse small, quick, and almost imperceptible; general coldness of surface and pallid countenance: he is fast sinking. Brandy and arrow-root were ordered every two hours, but he continued getting worse, and on April 17th, at 4 A.M., he died.

The friends being unwilling to admit a general inspection of the body, nothing further could be done beyond an

Examination of the shoulder.—On turning off the integuments, a small quantity of effused blood was found on the front of the shoulder, and to my surprise, a fracture of the clavicle, about a third of its length from the acromial extremity, with, however, but little displacement. The clavicle was then disarticulated from the sternum, and, together with the scapula and part of the humerus with their muscles, removed from the body and carefully examined. The acromion was broken at the usual place, about an inch from its extremity, but not

at all displaced, as the periosteum had not been lacerated.

When the deltoid muscle had been turned off from its clavicular origin, the coracoid process of the scapula was found broken about half an inch from its tip, into two unequal pieces, the smaller of which remained connected above with a piece of the triangular ligament still attached to the acromion, and below to the short head of the biceps muscle, which had pulled it down as far as the ligament would allow, about half an inch below and to the outer side of the stump of the coracoid process. This muscle was torn from the coracobrachialis about an inch; and to the top of the conjoined tendon of the latter, and of the lesser pectoral muscle, was attached the larger portion of the broken coracoid process, which had been drawn rather lower than the other portion, and to the inner side, but was still connected by a thin cord of fibrous matter to the coracoid process. The remainder of the triangular ligament was torn to pieces. In the front of the capsule of the joint was a slit about an inch in length, through which the cartilaginous covering of the head of the humerus was seen glistening. The remaining origin of the deltoid was divided, and the muscle turned down and cut off, which exhibited the head of the bone in its proper position.

Being anxious, if possible, to reproduce the same state of the shoulder as when I first saw him, in order to comprehend the extent of the displacement, I moved the humerus about in various directions,

when at last, by lifting up the shaft and pressing the head of the humerus forwards, I effected my purpose; the preternatural roundness in front of the acromion being produced by the head of the humerus being partially thrown forwards and over the front edge of the glenoid cavity, so that it became fixed, and behind it the depression below the acromion appearing, in consequence of the sinking of the tendons of the infraspinatus and teres minor muscles into the glenoid cavity, from the altered position of the head of the bone, which, however, did not protrude through the slit in the capsule, although it was there more distinctly visible. No other laceration of the tendons about the joint had occurred, except a very slight tearing of the tendon of the supraspinatus muscle. Nor was there any other fracture of bone.

Having thus detailed the history of this case, it remains only to offer a few observations upon the actual state of the injury as it appeared on examination of the parts. I am fully aware that the case is not so interesting as if the nature of the accident had been fully understood previous to death; but his condition was such, that I was glad to get him quiet as soon as possible, not knowing how soon symptoms of injury to the brain might appear, or how serious they might be. No cerebral disturbance, however, showed itself, but his constitution made no effort to rally against the severe shock it had received, and he speedily sunk.

It may at first appear strange that so common

accidents as fracture of the clavicle and fracture of the acromion should have been overlooked; and I am free to confess I was surprised on finding their existence; but on reference to the preparation, it will be seen, that though the clavicle was broken, yet the displacement was so slight, that it caused no deformity; and as to the acromion, the periosteum not having been lacerated, that portion of fractured bone had not altered its position in the slightest degree, and therefore in reality amounted to no more than a mere crack, which, but for the examination after death, must have remained unknown.

As to the partial dislocation of the humerus, it is an accident which I have often heard mentioned, but till the examination of the present case have scarcely deemed possible. Indeed, even in this, during life, I did not suppose it existed; and I still think that it could not have occurred without great laxity of the capsular ligament, and without the fracture of the coracoid process. I believe that the existence of the latter injury was necessary to allow the partial dislocation of the head of the humerus forwards; for had the coracoid process remained unbroken, I cannot imagine how the head of the membrane could have slipped so far before the glenoid cavity, as to allow of its being fixed in the position in which I found it when I first saw the patient, and to which I returned it after death.

The rent in the capsule, which is barely an inch in length, and scarcely more than a mere slit, did

not allow the escape of the head of the humerus, the articular surface, however, of which is seen through it. I think the rent was made by the broken coracoid process being driven upon it from without, rather than ruptured by the head of the bone from within.

The slight displacement of the head of the humerus from its socket is clearly indicated, not only by the examination of the parts, but also by the facility with which it was twice replaced when I first saw him; and, as I have already stated, I then considered it to be the dislocation under the pectoral muscle, so called, though with the head of the humerus projected much less forwards than usual.

I would wish, however, to state, that I do not consider the present case as offering any proof of the possibility of such accident as partial dislocation of the head of the humerus, unless, as in this instance, there be fracture of the coracoid process. For the disposition of that process is not merely as a protection against injury to the front of the joint, but it precludes the head of the humerus being projected so far before the edge of the glenoid cavity as to put it in a situation from which it cannot and must not be immediately withdrawn by the slightest action of either of the muscles attached to the tubercles. Whilst, on the contrary, if the head of the bone be driven backwards, it must be either so completely thrown from the glenoid cavity, as to produce dislocation on the dorsum, or so trifling,

that it is but for a moment slightly displaced, and reverts to its natural place so soon as the impelling force is removed.

[P. S. When Mr. South's Paper was read at the Society, the following case was related by Mr. Arnott, as having recently occurred in a patient received into the Middlesex Hospital under his care:—

Fractured Coracoid Process.— —— Errickson, a boy of 15 years of age, was brought to the Middlesex Hospital, Sept. 16, 1838, having fallen from a tree. He had fracture of the skull, requiring the use of the trephine: the left clavicle was also broken, and two of the ribs of the same side. He lived for ten days. On the post-mortem examination, besides the injuries already mentioned, it was found that the coracoid process of the left scapula had been broken off at its root. The point of fracture was just where this process becomes joined as an epiphysis, above the glenoid surface, to the body of the bone; and considering the age of the patient, there can be little doubt that perfect union had not been established.

Owing to the insensibility of the boy, and his constant motion, resulting from the injury of the head, it was not possible to keep the arm at rest, or properly confined in its bandages; consequently, an abscess had formed around the fractured ends of the clavicle; and also between the fractured coracoid process and its corresponding surface.—*Editor.*]

STATISTICAL ACCOUNT

OF

CHOLERA,

IN THE SEAMEN'S HOSPITAL, IN 1832.

By GEORGE BUDD, M.B., F.R.S.

PHYSICIAN TO THE SEAMEN'S HOSPITAL.

READ FEBRUARY 26TH, 1839.

DURING the winter of last year, a Report of some cases of cholera that occurred in the Seamen's Hospital, Dreadnought, in the month of October 1837, was presented to the Society by Mr. Busk and myself; and has been published in the Transactions of the Society for the present year. My attention being drawn to the subject, I was led to examine the records, preserved at the Dreadnought, of former visitations of cholera; and this examination has disclosed some facts illustrative of the influence of age, and some other circumstances, on the mortality in cholera, and the liability to that disease, which, I trust, will prove not uninteresting to the Society.

There are many circumstances which render the Dreadnought peculiarly favourable to inquiries of this nature. The patients are all sailors,—persons

whose circumstances are alike in every thing except climate,—and the only restriction to admission is, that the applicant must have been employed as a sailor within the six months preceding. When, therefore, we investigate in these patients the influence of age on disease, we find already eliminated the disturbing influences of sex, profession, and many other particulars, which render such investigation in general hospitals extremely complicated.

The registers of the Dreadnought, which might well serve as models for those of similar institutions, are kept with the greatest care, and contain almost all the information that can be desired respecting the nation, age, and quality of every patient admitted, the time he has been at sea, and the vessel in which he last sailed: and, by a recent regulation, the ages of all sailors who enter the port of London are registered at the Custom-House. I have obtained permission to examine these registers, and have thus been enabled to ascertain the proportional number of sailors of any age who enter the port of London, or the proportional number of the persons of a given age who are admissible into the Dreadnought.

It will be recollected that cholera broke out at Sunderland in October 1831, and made its first appearance in London in the month of February 1832. On the 17th of February of the latter year, a sailor, affected with cholera, was admitted into the Dreadnought, and died there on the 24th. No other cases were received; but between this time and the

18th of May, applications were made for the admission of 20 cholera patients, who were sent to H. M. S. Dovor, which, fitted up as a cholera hospital, was stationed in the river at Deptford, and was at that time under the Government charge. The disease did not break out in the Dreadnought till the 27th of May, when two of the patients were attacked; but, before the month of October, 15 cases occurred there, all of which were transferred to the Dovor. On the 18th May, the Dovor came under the management of the Dreadnought Committee, and between that time and the 12th of January 1833, 160 cases were received there. We proceed to give, under different heads, some analysis of these cases.

I. MORTALITY IN DIFFERENT PERIODS OF THE EPIDEMIC.

The following Table exhibits the number of cases admitted in each month, and the number of deaths and recoveries in these cases.

TABLE I.

	In May, from the 20th to the end.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Jan. to the 12th.	Total.
Cases .	12	23	39	42	21	13	2	6	2	160
Died .	8	16	24	26	12	4	—	2	1	93
Recovered	4	7	15	16	9	9	2	4	1	67

It will be seen from this Table,—

First. That the number of admissions increased during the months of June, July, and August; after which it rapidly diminished.

Second. That the proportion of deaths to recoveries was 93 to 67, or rather greater than 4 to 3; but that the mortality varied in a remarkable manner, becoming gradually less as the epidemic approached its termination. At first, the number of deaths was double that of recoveries; towards the end of the epidemic, that is, after the month of September, it was only half their number.

II. INFLUENCE OF AGE ON MORTALITY.

The second Table exhibits, in classes, the numbers of those patients whose ages were under 20, between 20 and 30, 30 and 40, 40 and 50, 50 and 60, 60 or upwards; with the number of deaths and recoveries in each class.

TABLE II.*

	AGES.						Total.
	15—20.	20—30.	30—40.	40—50.	50—60.	60 and upwards.	
Cases .	21	43	39	35	15	7	160
Died .	9	20	27	17	13	7	93
Recovered	12	23	12	18	2	—	67

* If in this Table we divide the second number by the first in each vertical column, we obtain a series of quotients which express the relative chance of dying in persons affected with cholera, whose ages are included in the respective columns.

This Table shows the extraordinary influence of age on mortality in cholera. The mortality was least in persons between the ages of 15 and 30; and in these the number of deaths was less than that of recoveries: it was greatest in persons above the age of 50; of 22 above this age, 2 only recovered; the age of each of these two was 53: of 13, whose ages exceeded 53, not one recovered.

III. INFLUENCE OF AGE ON LIABILITY TO THE DISEASE.

Advanced age not only is unfavourable to recovery in cholera, but gives a predisposition to the disease. This will be seen from Table III., in which the number of cholera patients, within certain limits of age, are compared with the proportional numbers of sailors within the same limits of age. The proportional numbers in this case were derived by taking from the registers at the Custom-House the ages of 5,000 sailors, entered in succession; by distributing these ages in classes, so as to obtain the numbers whose ages are comprised between the limits in question; and by reducing these numbers to the scale of 160.

TABLE III.*

	AGES.						
	Under 20.	20—30.	30—40.	40—50.	50—60.	60 or upwards.	Total.
Proportional number of Sailors .	17·056	76·032	36·160	21·504	7·488	1·760	160
Cholera Patients .	21	43	39	35	15	7	160

It appears from this Table, that persons between the ages of 20 and 30 are the least liable to cholera: the number of cases in persons between these ages is less than it would have been had all ages been equally subject to the disease, in the ratio of 43 to 76, which is rather less than 4 to 7. In persons above 30, the liability to attack continually increases with age. Between the ages of 30 and 40, the number of cases is greater than it would have been had all ages been equally subject in the ratio of 39 to 36, or 13 to 12; between 40 and 50, in the ratio of 35 to 21, or 5 to 3; between 50 and 60, in the ratio of 2 to 1: and in ages above 60, nearly in the ratio of 4 to 1.

A fact analogous to this greater susceptibility of old persons to the influence of the cholera poison,

* If in this table we divide the upper number by the lower in each vertical column, we obtain a series of quotients, which express the relative chance of taking cholera, incurred by persons whose ages are included in the respective columns, who are equally exposed to the causes of the disease.

is the increasing susceptibility of persons as age advances, to the influence of the poison of lead.

In a paper on colic of lead, recently published by M. Grisolle, is the following interesting statement: —"Having arranged my patients in four sections, comprising those of ages from 18—30; 30—40; 40—50; 50—70; I found the mean lengths of their respective sojourns at the manufactories 65, 60, 50, and 37 days. Hence it appears that the number of days necessary to catch the disease diminished as the age of the subjects increased."

It will be seen that to this affection as to cholera, it is past the age of 50 that the susceptibility increases with the greatest rapidity. There are, on the other hand, some poisons by which old persons seem to be less affected than young. Is this latter fact apparent only? Is the rareness of scarlatina, measles, or small-pox, in old persons, explicable from the circumstance, that the number is comparatively very small of persons who reach advanced age without having had those diseases which affect the same individual once only; and from the consideration that some of this small number may enjoy a constitutional peculiarity, which confers immunity from the disease?

If we multiply the numbers derived from Table III., which express the relative chance of taking the disease, by the numbers for corresponding ages (from Table II.), which express the probability of dying of the disease when taken, we obtain a series

of numbers that express the relative risk of losing life incurred by persons of different ages, who expose themselves equally to the causes of the disease. It appears from this calculation, that the risk is between seven and eight times as great for persons above the age of 50, as it is for persons between the ages of 15 and 30.

One practical inference from the preceding facts is, that before the question of contagion is settled, the charge of cholera patients should be entrusted to persons in the prime of life.

IV. INFLUENCE OF PREVIOUS HEALTH ON MORTALITY.

The previous state of health has also great influence on mortality in cholera. We have already stated, that of the 160 cases of cholera, 15 were sent from the Dreadnought, and occurred there in patients admitted for other complaints; the remaining cases were from vessels in the river, and occurred in persons who may be supposed to have been previously healthy.

The following Table exhibits the relative mortality in these two classes.

	From the Dreadnought.	From Vessels in the River.	Total.
Cases . .	15	145	160
Died . .	11	82	93
Recovered .	4	63	67

Of the 4 from the Dreadnought who recovered, 2 were discharged from the Dovor well or convalescent; the remaining 2 returned to the Dreadnought to be treated for their former complaints.

It will be seen from the Table, that, in persons previously healthy, the proportion of deaths to recoveries was 82 to 63, or rather less than 4 to 3; while in patients who came from the Dreadnought, the proportion of deaths to recoveries was 11 to 4, or 3 to 1, nearly.

The greater mortality in the cases from the Dreadnought cannot be ascribed to their having happened at a more unfavourable period of the epidemic, or in persons more advanced in life; these cases were distributed through the months of May, June, July, August, and September, in nearly the same proportions as the other cases of cholera; and five, or one-third of these patients, were above 40, which is very nearly the proportion of persons above 40 in the other cases. The greater mortality in the cases from the Dreadnought must, therefore, be attributed to the bad state of health of these patients when seized with cholera.

V. DIFFUSION OF THE DISEASE.

The cases of cholera that occurred in October 1837 were confined to the Dreadnought; none occurred in any other vessel in the river. In 1832, on the contrary, the disease was diffused in a remarkable manner; of the 160 cases admitted into the

Dovor, in that year, 15, as we have said, came from the Dreadnought; 3 came from the Thames, Dublin steamer: and two from each of the ten following vessels: City of Londonderry, Huntcliff, Trent, Courier, Thomas, Frances Charlotte, Zephyr, Mariamne, Regent, Eneighton; making, in all, 38 cases: of all the other cases, 122 in number, not more than one came from any one vessel.

The following Table exhibits the dates at which the several cases occurred in those vessels which supplied more than one case:—

Thames.	Londonderry.	Huntcliff.	Trent.
July. Aug. Sept. 9. 23. 10.	May. July. 24. 5.	May. 25, 28.	June. Aug. 22. 1.
Courier.	**Thomas.**	**Frances Charlotte**	**Zephyr.**
July. 7, 21.	August. 19, both.	August. 22, 28.	August. 25, 28.
Mariamne.	**Regent.**	**Eneighton.**	
Aug. Sept. 28. 1.	September. 21, 21.	December. 13, 20.	

There is another circumstance, interesting from its bearing on the question of the contagion of cholera, connected with the history of the Dovor during this period.

Three nurses and one of the medical attendants lived on board; other medical men, four in number, were in daily attendance; examinations after death

were made in almost every fatal case; there were generally several persons present at these examinations, which were conducted in an ill-ventilated cabin, where all the dead bodies, often 4 or 5, were placed; yet, not one of these persons, medical men or nurses, took the disease.

In the early part of 1833, on the subsidence of the epidemic, the Dovor was laid up. In the course of that year, nine persons, 8 patients and 1 of the nurses, died of cholera, in the Dreadnought; two of these patients were admitted affected with cholera: the rest for other complaints. The cases of recovery during that year were not recorded.

In 1834, in consequence of the reappearance of cholera, the Echo, an old steam-boat, was fitted up as a Cholera Hospital, and stationed, as the Dovor had been, in the river at Deptford; and 36 cases, of which 12 proved fatal, were received there between the 10th of August and the 14th of September. No cases were admitted into the Dreadnought during that year, and two cases only occurred there; the first in a patient, who was attacked on the 15th of August, four days after admission, and immediately removed to the Echo; the second in the captain's servant, a girl of 19, who never entered the wards; she was seized on the 30th of August, and died in the Dreadnought on the 31st.

The following Table exhibits the cases in the Echo, distributed, according to the age of the patients, into certain classes, and the number of deaths and recoveries in each class.

	AGES.					Total.
	15—20.	20—30.	30—40.	40—50.	50 and upwards.	
Cases .	10	13	3	5	4	35
Deaths .	1	2	2	3	3	11
Recoveries	9	11	1	2	1	24

It will be seen from this Table, that the disease in 1834 was not only less widely diffused, but that the individual cases were milder than in 1832.

In 1834, 11 in 35, or less than 1 in 3, died; in 1832, 93 in 160, or more than 4 in 7, died.

VI. INFLUENCE OF AGE ON RECOVERY.

The cases in 1834 exhibit, in a more striking manner than those in 1832, the influence of age on recovery.

Twenty-three of the patients were between the ages of 15 and 30, and of these, 3 only, or about 1 in 8, died; while of 12 who were above 30, 8, or two-thirds, died; and of 4 whose ages exceeded 50, 1 only recovered. The age of this person was fifty-two.

VII. INFLUENCE OF AGE ON LIABILITY TO THE DISEASE.

The preceding Table, like the corresponding one for 1832, shows that, for ages above 40, the liability to the disease increases with age. Of these patients, 9 in 35, or 1 in 4, were above 40; while of sailors

generally, 1 in 5 are above 40: 4 in 35, or 1 in 9, were 50, or upwards; while only 1 sailor in 18 is above the age of 50.

The cases in the Echo do not exhibit, like those in the Dovor, a mortality varying with the period of the epidemic; in the first half of the cases, 5 proved fatal; in the last half, 6.

We have seen that the first epidemic lasted from February 1832 until the month of January following. In 1834, the first four cases occurred, in the nights of the 5th and 6th of August, all in men (lumpers,) employed in clearing the Maitland transport, lying off Deptford, which had just returned from ——, and the crew of which had been discharged; and no case occurred in the river after the 13th of September, so that the duration of the epidemic was less than six weeks, a circumstance very unfavourable to the supposition, that the disease is contagious, or that it admits a long period of incubation.

In this epidemic, as in the former, the disease was very much diffused; with the exception of the cases from the Maitland, all the patients admitted into the Echo came from separate vessels; not more than one came from any one vessel.

In the Echo, none of the attendants took the disease; one of the nurses resided on board, with his wife and four children.

In 1835 and 1836, no cases of malignant cholera occurred in the river.

It is worthy of remark, that from the first appear-

ance of cholera in London, in February 1832, up to the present time, not one of the medical officers of the Dreadnought, or of the cholera hospitals connected with it, has taken the disease.

A CASE

OF

ANEURISMAL TUMOUR

IN

THE ORBIT,

CURED BY TYING THE COMMON CAROTID ARTERY.

By GEORGE BUSK,

SURGEON TO THE SEAMEN'S HOSPITAL, DREADNOUGHT.

READ FEBRUARY 26TH, 1839.

The case which forms the subject of this paper occurred nearly three years ago; but I have deferred giving an extended account of it, until time should have ratified the apparent success of the treatment.

Within the last twelve months I have had an opportunity of examining the man, and of ascertaining that no vestige remained of the aneurismal disease for which the operation was performed. The success of this operation may therefore, I presume, be considered certain.

Robert Simmons, a seaman, aged 20, of very healthy appearance, was admitted into the Seamen's Hospital July 13, 1835, exhibiting the usual symptoms of severe concussion of the brain.

There was considerable hemorrhage from the right

ear, a small wound behind the left, and some tumefaction over the right temple. He was pale and cold, and nearly insensible; but could be roused with difficulty.

It was stated that he had received from the gaff of the vessel to which he belonged, a severe blow on the right side of the head, by which he was immediately rendered insensible, and he continued nearly so to the time of his admission. He rallied considerably in an hour or two. The hemorrhage from the right ear continued all night; the next day, he was quite sensible, but appeared dull, and did not complain of any pain. The pupils were natural; the usual treatment was pursued. On the 15th he continued very dull, and was found to be quite deaf in the right ear. The eyelids and integuments about the left eye were swollen, from serous effusion; the pupil of that eye was dilated and fixed; and he was unable to move the globe of it in any direction. There was also slight paralysis of the facial muscles on the left side. The pupil of the right eye, and the motion of the globe were unaffected. On the 16th his general state was somewhat improved; the eye and face in the same condition. On the 18th he complained of head-ache, only over the left eye, the pupil of which was observed to be elongated downwards, and vision in that eye was slightly impaired. The only motion of the globe was an almost imperceptible rotation on its axis; and this motion was apparently involuntary. On the 24th his gums were slightly affected by mercury, and he complained, for

the first time, of what he termed an "uncomfortable numbness" in the left side of the face, and a sensation of dryness of the mouth, which, however, was as moist as possible. Some purulent discharge occurred from the right ear. On the 25th, the integuments of the face and nose, and the scalp, nearly to the vertex on the left side, had become exceedingly tender to the touch, without any morbid appearance. The eye was in the same condition. On the 28th he complained of pain in the left eye, which had become inflamed from constant exposure, consequent on the paralysis of the orbicularis. On the 31st, the lower half of the cornea had become nebulous, and pus was apparent between its laminæ. The eye, however, was much less painful than it had been; and he had hardly any head-ache. The discharge from the ear had stopped, and his general health was pretty well restored. On the 14th of August, the discharge from the right ear had recurred slightly, and he complained of various noises, like the ringing of bells, in his head. The left eye was free from pain, but the onyx was increasing; the paralysis continued the same; by the 3rd of September the anterior laminæ of the cornea had ulcerated, and allowed the escape of the interstitial matter; and the paralysis continued unaltered.

No change of importance took place until about the 20th of November, when he became affected with small-pox; he was sent to the Small-pox Hospital, whence he returned on the 1st of December. On his re-admission, the state of his face appeared

unaltered. The eye was generally prominent, and the conjunctiva much inflamed. The ulcer on the cornea was very large, and in an irritable state. The severity of these symptoms was soon subdued, but all attempts to remove the paralysis proved abortive. Sensibility, however, in some degree returned, preceded by anomalous painful feelings in the affected integuments.

Towards the end of January, as his condition appeared to have been stationary for some time, and he was very desirous of going home, he was on the point of being discharged; at this time his general health was very good; he was quite deaf in the right ear, but could hear very well with the left; paralysis of the muscles of the globe of the left eye, and of the left side of the face, was still present; sensibility was in some degree restored. The ulcer on the cornea was filled up, leaving an opaque cicatrix which occupied more than its lower half. Through the upper half, which had retained its transparency, he could see very well when the upper eyelid was raised. The globe of the eye was very prominent, and the eyelids were generally swollen; several large, tortuous conjunctival vessels were observed, passing to the lower edge of the cornea.

On the 1st of February, when examining the eye, I for the first time perceived a distinct pulsation of the globe; and on more close investigation, detected also a firm pulsating tumour in the upper and inner part of the orbit, immediately within the superciliary

ridge, and about half an inch in its transverse and longest diameter.

This tumour appeared to be situated between the levater of the eyelid and the bone, and was not evident externally; but when the eyelid was raised, it caused some projection of the loose conjunctiva. The pulsation of the tumour was accompanied by a very distinct thrill, which could also be felt on pressing the parts in its immediate neighbourhood. Through a small ivory stethoscope a very loud whizzing sound was communicated; this could also be heard on applying the instrument over the inner canthus of the right eye, and on the left side of the frontal bone, as high as the roots of the hair, and nearly as far back as the ear. The eye felt hot and uneasy; but, otherwise, he had no pain, and complained principally of very loud noises in the head: those in the right ear like the sound of church bells, and those in the left, the breaking of waves on the sea shore.

As temporary pressure on the left common carotid put a stop to the pulsation in the tumour and eye, and to the accompanying sounds, as well as to the noises in the head, it appeared clear that they all depended on a common cause, and that, probably, an aneurism of some vessel within, or close upon the orbit. I was not at the time aware of the two similar cases to which I shall afterwards refer; but entertained no doubt as to the propriety of treating this like an aneurism in any other part, and of tying the left common carotid. Twenty ounces of blood

were taken from his arm the same evening; and, on the following day, February 2, the carotid was tied in the usual place and manner. Immediately on tightening the ligature, the pulsation of the tumour, and that communicated to the globe, ceased, together with all the sounds, both internal and external. In the evening, four hours after the operation, obscure pulsation could be felt in the tumour, which had not however resumed its original size. The whizzing sound could also be plainly heard through the stethoscope, and over the same extent of surface as before the operation. The internal noises were also, at intervals, nearly as loud as before, but were sometimes absent. There was no pulsation in the temporal artery. He complained of pain in swallowing. Pulse 110. An opiate was given, and an evaporating lotion applied to the face and head.

The next morning the pulsation was very obscure, and the sounds much diminished. He had not slept, and complained much of pain on deglutition and on coughing, and of severe pain in the left hypochondrium. Pulse 120, sharp. A bleeding of sixteen ounces afforded immediate relief, and in the evening he was easier in every respect. On the 4th no remains of the tumour could be felt, and all pulsation was gone from the orbit, nor could any sound be heard by means of the stethoscope. The internal noises were also quite absent, and his hearing was somewhat improved. Pulse 100 soft; skin moist; and tongue clean.

On the 6th the eye appeared less vascular than

before the operation, and was not so prominent. He had occasionally some noise in the left ear, but none in the right. A small quantity of grumous blood passed from the left nostril during the night. On the 11th the eye was still more retracted within the orbit, and there was no pain nor pulsation. He sat up several hours. On the 15th the ligature came away, and the 18th his state is thus noted:— The wound was much contracted; the eye hardly prominent, and much less vascular. The ulcer in the lower half of the cornea filled up, leaving a dense leucoma, to which ran a large tortuous vessel. Vision perfect as far as the loss of transparency of the cornea would allow. There was no pulsation, nor any noises. Pulse 70, soft; appetite good; no pulsation in the temporal artery. The paralysis of the left side of the face and muscles of the globe continued complete; but sensation was perfect except on the left side of the nose; and he was more deaf in the left ear than in the right. From this time no material change took place, up to the time of his discharge from the hospital, on the 28th March 1836. He complained almost constantly of pain, commencing about the infra-orbitary foramen, and extending towards the nose, which was in some degree relieved by the use of veratria.

He went to a distant part of the country, and I had not an opportunity of seeing him again for about seven months, when he had resumed his occupation as a seaman, and came to London in that capacity. His general health and strength appeared quite re-

stored, but the local symptoms were about the same as when he left the hospital. The paralysis of the face continued; sensation, however, was perfect, and he was quite free from pain. He was still deaf in the left ear, but heard tolerably well with the right. I saw him again about eleven months ago, on his return from a voyage to Quebec; he was then in perfect health, and the paralysis of the face appeared slightly diminished. The deafness continued in the left ear, and in the right about half the membrana tympani was deficient; but on that side he heard tolerably well. The exposed cornea and conjunctiva had become xeromatous; but the eye was free from pain or uneasiness, and appeared rather deeper in the orbit than the other. The upper half of the cornea was clear, and vision through that part unaffected. The pupil was fixed. No trace of tumour or pulsation could be detected in or about the orbit; and no pulsation could be felt in the carotid, or any of its branches.

Two cases, by description very much resembling the one I have now related, are recorded in the 2nd and 6th volumes of the Transactions of this Society; the former by Mr. Travers, the latter by Mr. Dalrymple. A case of supposed aneurismal tumour in the orbit is reported by Schmidt in the 1st volume for 1831 of Ammon's Ophthalmological Journal; and Mr. Guthrie, in his work on the operative surgery of the eye, also mentions a case seen by himself, and examined after death. These are, as far as I have been able to ascertain, all the reported cases

bearing any resemblance to the one above related. Dupuytren is said to have extracted an eye for a similar affection; but the account of the case in the Revue Medicale is by no means clear. The exact nature also of the affection in Schmidt's case is not very easily deducible from the account given; but the tumour appears to have presented little of the aneurismal character, as it was destitute of pulsation. Before the operation undertaken for its removal, it was considered to be an encysted tumour; but, when cut into, its structure was found to be cellular, and it afforded a copious flow of arterial blood. The incisions, however, appear to have healed readily, and the tumour to have become dispersed. In Mr. Guthrie's case the affection occurred in both eyes; and with the exception of external tumour, the symptoms are stated to have been similar to those in Messrs. Travers and Dalrymple's cases. The case of Mr. Guthrie is particularly valuable in having afforded an opportunity of ascertaining, by examination after death, the exact nature of the affection, and, consequently, proving the possibility of considerable sized aneurisms being formed by the ophthalmic artery, without material impairment of the functions of the optic nerve.

It may thus afford some assistance in attempting to form a correct opinion as to the real nature of the affection in the other cases, to which it is stated to have borne a resemblance, and also in the one the account of which I have just presented.

I have alluded to these two cases partly with a

view of drawing attention to the probability of the supposition I am inclined to adopt, of their being instances of true aneurisms in the orbit, and not, as has been considered, of erectile tumours or aneurism by anastomosis; and, in support of this view, I would venture to suggest, that these cases agree in three essential particulars.

1. The sudden accession of the disease, attended with pain.

2. Its rapid increase.

3. The powerful pulsation occurring in the tumours when recent and small; in all of which circumstances do they differ from the erectile tumours, as described by Mr. John Bell under the name of aneurism by anastomosis; and when to this is superadded the strong aneurismal whizzing sound, which was heard over so extended a space in the present instance, and which may possibly have existed in the others, as they were attended with similar internal noises, the presumption of the affection being in all really an aneurism of some vessel in the orbit, appears to me materially strengthened; and Mr. Guthrie's case may possibly lead to the supposition of the ophthalmic artery itself being the seat of the affection.

The success of the treatment by ligature of the carotid cannot be adduced as further proof of the correctness of this view, since the same success attended that operation for an undoubtedly erectile tumour of the antrum in the hands of Mr. Pattison;

for an external nævus in one of these cases in which it was employed by Mr. Wardrop.

P.S.—I have been very lately favoured with an account of a case which occurred to Mr. Scott of the London Hospital, which bears so great a similarity to the one I have just related, that it may perhaps be considered an interesting addition to the paper.

A boy, William Cooper, who had fallen into a ship's hold, was brought to the London Hospital, October 2nd, 1834, with concussion of the brain, violent contusion and swelling on the right side of the head, and protrusion of the right eye, which was fixed and motionless, the pupil dilated, and vision lost. There were no symptoms of cerebral pressure.

He gradually recovered from the concussion of the brain, the eye becoming gradually more prominent. The protrusion of the globe immediately after the accident, without symptoms of cerebral compression, proved that it arose from extravasation of blood within the orbit, and the further continued protrusion rendered it probable that the aperture in the vessel from which the blood escaped had not closed:—the symptoms were not so acute as to indicate suppuration. As the globe became more prominent, pulsation was felt on pressure, and when the palpebræ were separated, the eye could be distinctly seen to be propelled forward at each stroke of the heart.

Pressure was made on the globe; but, after being borne for two days, it occasioned so much pain that it was abandoned. On Tuesday, November 10, just after examining the eye, a profuse arterial hemorrhage occurred from the nose. Mr. Scott commanded it by pressure on the common carotid artery, and immediately secured that vessel. The protrusion of the globe directly receded in a great degree, and its prominence afterwards gradually diminished.

ON

THE SOFTENING

OF

COAGULATED FIBRINE.

By GEORGE GULLIVER, F.R.S.

ASSISTANT SURGEON TO THE ROYAL REGIMENT OF HORSE GUARDS.

Communicated by Sir JAMES M'GRIGOR, Bart. M.D. F.R.S. &c.

READ FEBRUARY 26TH, 1839.

The nature of many of the albuminous morbid products affords an extremely interesting subject for further inquiry, since it is probable that a great step in the advancement of pathology may be dependent on the acquisition of a more precise knowledge of their distinctive characters. Although these matters differ most remarkably in their consequences, and are apparently developed in the living body under conditions essentially distinct,—seeing that they have properties more or less analogous to those of albumen—M. Andral, and most of the pathologists of the French school, have earnestly insisted on this analogy, with the view of informing us, that the substances in question are nothing but a modification of one of the proximate principles of the blood.

It is possible, however, that this kind of generalization may be premature, and it seems doubtful whether, by attaching too exclusive an importance to rather vague generic characters, it may not have tended to retard that more particular examination of these substances, still so essential to a satisfactory knowledge of their intimate constitution; for, in the present state of pathological science, it is with their specific differences that we require to become acquainted; and their affinity to albumen, and common points of resemblance, so far from leading us to this desirable end, present the greatest difficulty in the investigation.

Of all these products, from its constituting one of the most frequent elementary forms of disease, pus is the most important; and as various matters have been comprised under this denomination, some investigation of their peculiar properties would appear to be necessary. Hence any contribution towards this object will not perhaps be altogether unacceptable, and I therefore beg to submit to the Society a narrative of some experiments and observations from which it may be concluded that a fluid which has generally been described as purulent is, notwithstanding, of an essentially different nature. I have elsewhere* mentioned incidentally that this matter is softened fibrine, and I now adduce the evidence on which that opinion was founded, together

* Researches on Suppuration. Philosophical Magazine: September 1838.

with such remarks as may appear necessary by way of illustration.

1. *On the Concoction of Fibrine.*

EXPERIMENT I.

A clot of fibrine, such as is so often found there after death, was taken from the heart, and carefully secured in a perfectly clean portion of small intestine turned inside out, so that the fibrine was in contact only with the peritoneal surface of the gut. It was then placed in a water bath, and kept for forty three hours at a temperature varying from 96 to 104 degrees, when the fibrine was found to have become partially softened, particularly in some places towards the centre. It had rather an offensive, though not at all a putrid odour, and no ammoniacal gas appeared to be emitted from it, judging from the test of muriatic acid.

About a drachm of the softened fibrine was collected for examination. It could not have been distinguished from pus either by its colour and consistency, or by the facility with which it was miscible with water; it was not rendered ropy by caustic volatile alkali, and presented no irridescence when pressed between plates of glass before a candle in the manner pointed out by Dr. Young. Subjected to the microscope, the fluid was found to be loaded with particles extremely variable in size and form; some appeared very dense, others were flaky and larger

than pus globules, but the greater number were smaller, extremely irregular in shape, not at all globular, like pus, but consisting of very minutely granular masses, and a few rounded particles about half the diameter of those of the blood were observed. On the addition of acetic acid all the particles soon disappeared, except a few which seemed more compact and required a longer time for solution. Treated with sulphurous acid, they swelled considerably, and became nearly invisible. Some of the softened fibrine was put into a small vial of water, a similar quantity of the clotted fibrine which had not been concocted being in like manner placed in another vial. Both were set aside for four days, the temperature of the air at the time ranging from 60° to 74°, when the mixture with the concocted fibrine was but very faintly putrescent, and that in the other bottle highly so.

EXPERIMENT II.

A coagulum of fibrine from the heart was concocted at a blood heat for sixty-five hours. The entire circumference was reduced to a pulpous substance in every respect similar to that just described, except that slight putrefaction had commenced, and a number of very minute globular particles, hardly one third the size of the blood corpuscles, were observed, exhibiting lively motions on their axes, as if animated.

EXPERIMENT III.

Some fibrine from the heart was inclosed in a glass tube, and subjected to a blood heat for seventy-four hours. A fluid resembling pus was the result, but differing from pus, as in the former instances. It had begun to putrefy: a small quantity was put into a vial, and a little of the clot which had not been concocted into a another bottle. Both were set aside for five days, when the latter had become highly putrid; and the former only faintly so. The temperature of the air was about 65°. On examining the concocted fibrine at this time with the microscope, numerous very opaque, and slightly oval particles were seen, not above $\frac{1}{10000}$th of an inch in diameter, and at the end of seven months they were observed again unchanged, the fluid having been kept in a corked vial. These little bodies did not exist in the fibrine which had become putrid without artificial heat.

EXPERIMENT IV.

Some fibrine was obtained from venous blood by agitation in the usual manner, and the colouring matter washed away, though not completely so. After being inclosed in a glass tube and concocted for seventy-one hours, a fluid matter was produced, of the consistency of thin pus, but of a reddish colour. It had begun to putrefy; it was faintly irridescent when submitted to Dr. Young's test; several

globules were observed with the microscope, all smaller than those of pus, the largest not exceeding $\frac{1}{4000}$th of an inch in diameter, and the smallest measuring about $\frac{1}{8000}$th. The former were rough on the surface; the latter regularly spherical: they all disappeared on the addition of oxalic or acetic acids. The mass of the fluid was constituted as described in the first experiment.

EXPERIMENT V.

With a view of counteracting the effect that oxygen might have in promoting putrefaction, several clots of fibrine were concocted in vials with phosphorous or with zinc, which were so attached to the corks as not to be in contact with the fibrine. Although the vials were hermetically sealed, the softening of the fibrine went on during the coction as in the former experiments, the pulpous matter presenting the same characters as in the first, with the exception of emitting a much more offensive odour.

EXPERIMENT VI.

Some of the fibrinous concretion formed, in consequence of inflammation, on the pleura of a dog, was confined in a glass tube, and subjected to a blood heat for eighty-four hours, when it was found to be throughout softened, and presenting just the colour and consistency of pus, from which however it was easily distinguishable by the characters noticed in the other trials.

EXPERIMENT VII.

A fibrinous clot from the heart having been concocted for seventeen hours, was found only to have become slightly whiter, tougher, and more opaque, than at first.

2. *Softened Fibrine in the Heart and Aorta.*

CASE I.

A lunatic named Winkworth, aged 58, of the 2nd garrison battalion, died of pulmonary consumption. Among the calumnæ carneæ of the left ventricle, several clots of fibrine were situated, containing a pulpous creamy matter in their centre. This was not irridescent when submitted to Dr. Young's test; it became nearly transparent when treated with acetic acid; it was not rendered ropy by ammonia or the muriate of this alkali.

CASE II.

J. Cowan, 56th regiment, aged 29, died of pulmonary consumption. Some fibrinous clots were found among the fleshy columns of both ventricles, similar concretions of smaller size were attached to the inner membrane of the descending aorta, and some of the smaller branches of the pulmonary artery were filled with coagula. All these clots were more or less softened in the centre, the surfaces of those

in the heart and aorta being toughish and cyst-like. The matter resembled pus in colour and consistency, but differed from it in being composed of very irregular particles and a few extremely minute globules, all readily soluble in acetic acid, swelling and becoming indefinite under the action of sulphurous acid, and not irridescent when placed before a candle. In short, it was destitute of pus globules, and presented just the same characters as the softened fibrine described in the first experiment.

CASE III.

James Cumming, aged 29, 86th regiment, died of lumbar abscess, complicated with tubercular consumption. Two fibrinous concretions, as above described, and similarly softened, were found in the left ventricle, and the examination of the creamy matter gave the same results as in the preceding case.

CASE IV.

John Owen, aged 29, 86th regiment, died of pulmonary consumption. Some fibrinous clots, irregularly softened, were attached to the inner surface of the right ventricle, and others of smaller size to the internal membrane of the aorta; the latter were softened in the centre. The matter presented the same characters as in the other cases.

3. *Softened Fibrine in the Veins.*

CASE V.

Cornelius Murphy, aged 39, 44th regiment, died of pulmonary consumption. Both the femoral veins were occluded with coagula, which, in some situations, had become of a whitish colour and softened towards the centre. The fluid was composed almost entirely of irregular particles soluble in acetic acid, and had none of the properties of pus but its colour and consistency.

CASE VI.

John Edwards, aged 21, 41st regiment, died of empyema. Both femoral veins were filled to a considerable extent with coagula, which had become partially white in some places where there was central softening, the matter exactly resembling that noticed in the former case.

CASE VII.

William Edwards, aged 25, 86th regiment, died of pulmonary consumption. The right iliac vein was filled with a firm clot, in the centre of which was some softened fibrinous matter, of the same characters as previously mentioned.

CASE VIII.

Corporal Pat. Long, aged 35, 86th regiment, died of chronic dysentery; the large intestines were ulcerated, but no collections of pus could be detected in any part of the body. The cava, renal, femoral, and saphena veins were completely filled with a clot, which in the former had become softened in the centre, the fluid being of a reddish brown colour. It was faintly irridescent, and observed under the microscope to be composed principally of very irregular particles, similar in all respects to those of softened fibrine, but pervaded also by a considerable number of globules, somewhat smaller than those of the blood, pretty regular in size, and rough on the surface. On the addition of acetic acid or carbonate of ammonia they instantly disappeared, and the irregular particles were slowly dissolved in the acid.

CASE IX.

John Smith, aged 18, 17th Foot, died of peritonitis: there was a purulent collection between the duodenum and liver. The longitudinal sinus was filled with a clot, in which there was central softening, the matter presenting in all respects precisely the same characters as in the preceding case.

The foregoing experiments and cases are selected

from a much greater number, which it is needless to detail, since they all tend to the same result. It should be noticed that the softened fibrine was, like pus, generally easily miscible with water, but more readily putrescent than pus, although less so than the fibrinous coagula which had undergone no change. Among the numerous instances in which fibrine was submitted to concoction, there was only one in which softening towards the centre of the clot was observed. It is prone to occur in this situation in the living body, perhaps because the centre is the most distant point from the living parts; for it will appear in the sequel, that an extremely low state of the vital powers is favourable to the formation and softening of the coagulum.

The fibrinous pulp in the veins was sometimes sparingly pervaded by globules differing from those of pus, in being smaller and readily soluble in acetic acid, or solution of ammonia. They closely resembled the appearance of the blood corpuscles when about to putrefy, that is, rough on the surface, or mulberry-shaped, as if each were composed of a number of smaller granules. Considering, therefore, the characters of these globules,—that they were not often met with, and that when they were they by no means formed the principal bulk of the pulpous fluid, so far from being essential to its consistency and opacity, they are rather to be regarded as a few blood-corpuscles retained in the clot, and modified by stagnation and concoction. However, as it not

unfrequently happens that the clot becomes softened before the colouring matter is absorbed, or the fibrine separated from the blood-corpuscles, the pappy portion in such cases will be more or less tinged in consequence, and the globules in question may be found more abundantly. They occur very rarely in the clots of the heart, where the fibrine generally separates more completely from the corpuscles. Most of the cases which I have observed in the veins have not presented marks of inflammatory action in the coats of the vessels, such as roughness of the inner membrane from adherent coagulated lymph, or increased vascularity or suppuration in their cellular sheaths. The softening of clots of fibrine appears, indeed, to be independent of inflammation, although this process and its consequences may be expected to occur sooner or later in the neighbourhood, and we may accordingly find true purulent fluid mingled with the softened fibrine, just as we often observe pus with cancerous and tubercular matter.

It may be observed that the softening of fibrine certainly occurs sometimes without appreciable suppuration in any part of the body. I have seen such cases, and Dr. Davy informs me that he has witnessed similar instances.

Although the occasional obstruction of the veins by sanguineous coagula, whether softened or not, has become of late years well known from the labours of the continental pathologists, and particularly in this country from several reports of dissections in the

magnificent work of Dr. Bright, as well as from the essays of Mr. Arnott, Dr. Geo. Burrows, and Dr. Copeland, my observations lead me to believe that the affection is not only more frequent than is generally supposed, but more concerned in disease, a circumstance to which my attention was first directed by Dr. Davy. Those who have not been in the habit, when examining dead bodies, of accurately attending to this point, would be surprised at the numerous examples of this condition noted in the register of dissections made under his superintendence at Chatham. The clots were in most instances partially whitened and softened in the centre; they were found in the heart, and also adhering to the inner membrane of the aorta; in the veins of the lower limbs, as well as in the cava, portal, and renal veins; in the pulmonary vessels, and in the sinuses of the dura mater. They were chiefly observed in subjects who, having long suffered from various chronic maladies, had great prostration of the vital powers, and languor of the circulation during the last days of existence; a state which was also remarkable in the cases related in this paper, and which seems especially favourable to the formation and softening of the clot. If, therefore, a vein becomes obstructed with coagulated blood or fibrine, which cannot easily be absorbed or organized in consequence of the very feeble vitality of the patient, the clot may be expected to soften, and it is accordingly in such cases that the affection may be often

found after death, although never suspected during life.*

On the contrary, when the organic force is active, we know how readily fibrine becomes the seat of new formations, that it will acquire firmness and remain for years in the sac of an aneurism, and that extravasated blood is generally soon absorbed after injuries. In repeating those experiments of M. Gendrin, in which a seton is passed through a clot of blood, either in or out of the vessels, I could only twice succeed, after numerous trials, in producing any thing like pus in the substance of the coagulum. In these instances the animals were greatly reduced from the effect of previous operations, and the matter proved to be nothing more than softened fibrine, such as I have described it. When blood was injected into the subcutaneous cellular tissue, or into the serous cavities, its complete coagulation was retarded for two or three hours, while some of the same blood kept at the animal temperature in a bottle always coagulated in less than eleven minutes. Absorption of the clot took place with great rapidity, and was hardly delayed by passing a seton through it, so that on the second or third day it had nearly disappeared,

* The cause and effects of the coagulation of blood in the heart and vessels during life, and the connection of the phenomenon with disease, as well as the changes to which the clot becomes liable, and the effects of the mixture of the softened fibrine with the circulating blood, are all subjects full of interest and importance, requiring further inquiries.

the threads approaching the skin, where of course pus would be formed independently of the extravasated blood. When two ligatures were so placed on a vein as to include an inch or two of the column of blood, it took about three hours to coagulate perfectly, as Sir Astley Cooper had noticed in his experiments. In two or three days it lost its colouring matter, becoming whitish, tolerably firm, and shrunken. After a seton or a leaden shot was put into the clot, no appearance of a purulent-like fluid was seen towards the centre, although pus was frequently present between the coagulum and lining membrane of the vessel, and still more often in the cellular coat and neighbouring parts.

It may be observed, therefore, that as the doctrines of M. Gendrin concerning suppuration, have been extensively promulgated in almost every work on the subject recently published in this country, the preceding cases are interesting in this respect, since they are of that species to which he attaches so much importance, as proofs of the conversion of clots of fibrine or blood into pus. However, as Mr. Palmer remarks, M. Gendrin appears to have confounded the fibrine and corpuscles in a manner not consistent with the known constitution of the blood; and although some purulent or other matters may be occasionally mixed with the softened fibrine, still as it results from several observations that the latter is essentially distinct from pus, and constitutes the whole or greater part of the so-called purulent fluid

in these cases, it is at least doubtful whether they admit of the inference which M. Gendrin has drawn from them.

The experiments and observations recorded in this paper appear to admit of the following conclusions:—

1st. That coagulated fibrine, when removed from the body and subjected to a blood heat, commences to soften in about forty hours, assuming the colour and consistency of pus, but easily distinguishable from it by microscopic and chemical examination.

2nd. That the purulent-like fluid found in the fibrinous clots of the heart and arteries, and so frequently in the veins, is essentially distinct from pus, and analogous to, if not identical with, softened fibrine.

3rd. That the softening of coagulated fibrine is an elementary pathological condition of frequent occurrence, distinct from suppuration, and constituting a considerable proportion of the cases generally denominated suppurative phlebitis.

Lastly, I may observe, that I have frequently found pus mixed in considerable quantities with the pulpy fibrinous matter; and in two instances some purulent globules were observed, completely insulated, in the centre of a clot, from the neighbouring tissues. But in both these cases pus was also detected in the blood; and when it is considered how frequently this contamination exists, it will not appear surprising that the particles of pus should become entangled in coagula contained in the vessels.

Nor does this circumstance at all invalidate the conclusion, that the softening of coagulated fibrine is a disease of much interest and importance, quite distinct in its nature from suppuration, although the two affections have been generally regarded as identical.

Windsor, January 23, 1839.

CONTRIBUTIONS

TO THE

PATHOLOGY OF THE SPINAL CORD.

BY WILLIAM BUDD, M.D.

COMMUNICATED BY JOHN G. PERRY, ESQ.

READ MARCH 26TH, 1839.

THE functions of the spinal cord have, of late, much engaged the attention of physiologists, and have been studied with great success by Marshall Hall, Müller, Volckmann, and others. The leading fact, which their investigations have developed, may be thus briefly stated:—When the connection of the spinal marrow of an animal with the brain is severed by decapitation, or otherwise, and a stimulus is applied to the surface of the body, the influence of that stimulus is transmitted to the spinal marrow, and, being thence reflected to motor nerves, causes contraction of various muscles. In the experiments which show the different steps of this process, it is certain that the agency of sensation and volition is excluded. The part which the spinal marrow takes in the action has suggested the term reflex function. It has been further shown, that the brain has a re-

flecting power of the same kind: that the muscular contractions excited in this way, are, in all cases, independent of volition; but that, in reflex operations of the brain, sensation is probably concerned.

I shall not stop to inquire into the originality of the recent investigations on this subject: it will be allowed by every one that the physiologists above named have made many and important additions to the facts established by former inquirers, and have, with a precision not attained by these, assigned to the functions of the spinal cord their real domain in physiology and pathology: and in whichever of these aspects we regard the subject, we are unavoidably led to acknowledge the interest and importance it owes to the valuable researches of Dr. Hall.

The investigations of physiologists have consisted chiefly in experiments on the lower animals: it is the object of this paper to show that, under certain circumstances, the operation of the reflex function is exhibited in man, in the same way as in decapitated animals. This I shall do by a series of cases of affection of the spinal marrow: as in these cases the inquiries are instituted on rational beings of our own species, they offer peculiar advantages for the study of some of the conditions of the reflex function.

CASE I.

John Lang, aged 43, and of temperate habits, without known cause gradually became crooked in

the back, and paraplegic, at the age of 18; but regained perfect use of his limbs at the end of two years. The paralysis returned twice; first after an interval of twelve years, and again after two more: each time it followed protracted exertion, but did not continue longer than a few weeks. It returned for the fourth time, and had continued fifteen months, when I first saw him. The curvature of the spine had not increased since the first illness, and in the intervals mentioned the health was quite good. There never had been, nor was there subsequently, any indication of abscess. In the first three attacks sensation was nearly extinct in the palsied limbs, but they had never exhibited involuntary movements. I saw him first in July 1836; and between that time and April 1837, visited him many times, and took the following notes of his case.

There is a projection in his back, without lateral deviation, forming a vast abrupt tumour, and comprising the dorsal vertebræ from the fifth to the eleventh inclusive: the spinous processes of all these are very prominent. The tumour is somewhat tender on pressure, but not otherwise painful.

Sensation in the lower half of the body begins to fail at the umbilicus, and is very much impaired immediately below it: in the lower extremities it is nearly extinguished; when these are smartly pinched, the patient perceives the nature of the act, but the sensation is very feeble. Has no power of voluntary motion over his lower extremities; once or twice, while he was making strong efforts of the will,

I observed a very limited motion of the great and second toes; but had I not watched very narrowly, these movements would have escaped my notice: after having occurred once, or at most twice, he could not repeat them.

These are the only voluntary movements of the lower extremities which the patient can execute. When, however, any part of the skin is pinched or pricked, the limb that is thus acted upon jumps with great vivacity: the toes are retracted towards the instep, the foot is raised on the heel, and the knee flexed so as to raise it off the bed: the limb is maintained in this state of tension for several seconds after withdrawal of the stimulus, and then becomes suddenly relaxed. Once or twice, while the left leg was thus excited, the great and second toes of the right foot were simultaneously drawn towards the sole: the converse never occurred, and, in general, while one leg was convulsed, its fellow remained quiet, unless stimulus was applied to both at once. The contractions excited by stimulating the left leg are uniformly more vigorous than those excited in the right by a like stimulus. In these instances, the pricking or pinching was perceived by the patient; but much more violent contractions are excited by a stimulus of whose application he is perfectly unconscious.

When a feather is passed lightly over the skin in the hollow of the instep, as if to tickle, convulsions occur in the corresponding limb much more vigorous than those induced by pinching or pricking;

they succeed one another in a rapid series of jerks, which are repeated as long as the stimulus is maintained. In these experiments the patient is quite unconscious of any thing touching his limb. When asked if he feels any thing, his invariable reply is, "No, I feel nothing, but you see my leg feels well enough." When any other part of the limb is irritated in the same way, the convulsions which ensue are very feeble, and much less powerful than those induced by pinching or pricking. No movements are excited in his lower extremities by tickling any point in the upper half of his body, though such tickling occasion laughter.

Convulsions, identical with those already described, are at all times excited by the acts of defecation and micturition. At these times the convulsions are much more vigorous than under any other circumstances, insomuch that the patient has been obliged to resort to mechanical means to secure his person while engaged in these acts. To this end two large loops of saddlers' webbing are nailed to the floor; into these the feet are inserted; while two longer loops, also nailed to the floor, are adjusted over the knees as soon as the patient is placed on the night-stool: an attendant is also required to hold down the thighs. During the act of expulsion the convulsions succeed one another rapidly, the urine is discharged in interrupted jets, and the passage of the fæces suffers a like interruption. The convulsions become more feeble towards the completion of the act, and the stream of urine becomes

continuous. In the case of making water, the convulsions are uniformly more vigorous the more the bladder is distended. When sufficient precautions had not been taken to secure his person, it had occurred to the patient to be thrown violently forwards on the floor. The passage of urine is felt by the patient, but the sensation is of a smarting kind. Slight involuntary contractions occur in the legs whenever the bladder is distended, and also when the desire to relieve the rectum is manifested. In all these circumstances, the convulsions are perfectly involuntary, and he is unable, by any effort of the will, to control or moderate them. The passions have no power of exciting convulsions. After the lower extremities have been much excited, a sense of tingling in them is experienced. Motility and sensation in the upper half are unimpaired, and quite natural. Appetite and digestion pretty good; loss of flesh inconsiderable, and not progressive; nutrition of the legs good.

Lang continued nearly in the same state until the spring of 1837, when, without any remedial means, he regained voluntary power in his lower extremities. and sensation also began to increase. These functions gradually improved; and as voluntary power increased, the susceptibility to involuntary movements, and the extent and power of these, diminished. When I last saw him he was able to walk a little on crutches, and sit up many hours; but he was still obliged to secure his legs when his bowels were moved.

At the period when the paralysis was the most complete, there was some difficulty of breathing and palpitation; and both these symptoms were always increased when the patient fell asleep, so that he was soon awakened by the distress they occasioned.

The interest of this case lies in the coincidence of these two circumstances:—total loss of voluntary power in the lower extremities,—involuntary muscular contractions, excited by application of stimulus to the skin or mucous membranes. There can be no doubt that these contractions were of the same nature, and excited by the same process as those observed in a decapitated animal. Although sensation was never quite extinct in Lang's lower extremities, it was evidently not concerned in the production of the involuntary contractions; for when an artificial mode of stimulus was employed, the convulsions were uniformly the most vigorous in that case in which the application of it was not felt by the patient, namely, when the hollow of the foot was lightly touched with a feather. Here then we have oral evidence from the subject of experiment, that these acts are quite independent of sensation and volition. The fact that such vigorous convulsions were excited by touching the hollow of the foot with a feather, is of great interest, and tends to show that the nerves which transmit these impressions to the spinal marrow are,—if not the same with those of true sensation,—most actively excited by a stimulus which produces strong impressions on

the sensitive nerves. Every one knows how urgent is the sensation of tickling in the hollow of the foot. Volkmann has proved that these two kinds of nerves (if there be two kinds) arrive at the spinal marrow in one bundle, namely, the posterior roots. That their distribution should be alike, is obvious, for their purpose is the same,—the reception of external impressions.

We must not fail to remark, that in the case of Lang convulsions were never induced by excitement of the passions.

Although paralysis lasted nearly two years, the lower extremities continued stout and muscular. This is interesting, because it has been found to occur in other cases of the same kind. In paraplegia, with entire loss of motility, the palsied limbs usually waste in a remarkable manner.

CASE II.

A young lady, of scrofulous habit, after having been affected with caries of the cervical vertebræ, and symptomatic abscess in the pharynx, for about two years, became paralyzed in the arms, at first exclusively, but in a short time afterwards in the right leg also. When I saw her, paralysis of the arms was complete as regards motility; sensation was much impaired, but not extinct. The leg was palsied only in regard to voluntary motion, and exhibited involuntary contractions under the same circumstances as in Lang's case. They were, however,

more readily excited: the slightest disturbance of the bed-clothes in contact with that limb excited a very energetic contraction, throwing the limb into the same attitude as that described in the former case. After the contraction had lasted a few seconds, the muscles suddenly became relaxed, and the limb fell to the horizontal position. On each renewal of the stimulus, the contraction which ensued was much less vigorous than the previous one. The convulsions excited by defecation and micturition were much more powerful than those induced by any other cause. Twice during these acts the right arm had been convulsed in the same way as the leg, but in a much more feeble degree. Sensation in the right leg not much impaired. No convulsions ever remarked in the left arm or leg. The right leg was convulsed whenever the bladder was distended. Under all circumstances, the convulsions of the right leg were attended with pain, which was described as identical with that of cramp.

Dejections voluntary: sensation and volition were unimpaired in all parts except those before mentioned. Intellect and memory were not impaired.

This young lady was gradually wasted with hectic, and died with symptoms of suffocation. I could not obtain permission to open her body.

The successive diminution in the vigour of the contractions on each renewal of the stimulus, shows that the reflex motor power, like voluntary power, is liable to exhaustion. This is the only case I have seen in which the convulsions caused pain.

CASE III.

Robert Holland, a sailor, aged 17, of florid complexion, and robust growth: healthy until his present illness. In August 1837, received a severe blow on his back from the boom of his ship, which did not, however, disable him; he continued his work as usual. From that time suffered occasional pain of the loins and weakness in the back, especially when stooping. This continued without other complaint until the beginning of December, when he began to experience difficulty in running, and a sensation, when he attempted to run, as if his legs were tied; he could still climb the rigging, and continued his usual work throughout that month. The 1st of January 1838, he was obliged to desist, on account of increased impediment to the movements of his legs. From the 1st to the 4th he was still able to walk, though with much difficulty; when he attempted to stoop he fell on his knees, and could not rise again without the help of his hands. No weakness of the arms; up to that time there had been no involuntary movements of the legs. On the 4th of January was confined to bed on account of inability to stand, or to move his lower extremities. On the 8th of January he was admitted to the Seamen's Hospital; on admission, his lower extremities were observed to be in extension and very rigid, with sensation unimpaired, except slight numbness of the thighs. There was, for a few days after admission, difficulty of making water,

which was passed with much straining. The tetanic condition of the lower extremities continued; and in the interval between admission and the 11th of March 1838, the state of the patient was as follows:—

Sensation in the lower extremities unimpaired; voluntary motion abolished in these limbs, which are rigid, from permanent contraction of the muscles. The legs are sometimes extended, sometimes bent upon the thigh, and the transition from one condition to the other is quite involuntary. When these limbs are in extension it requires great force to bend them in the slightest degree; and when that force is withheld, they immediately return to their former position; the converse holds when the legs are flexed. When any part of the skin of the lower extremities is pinched, the corresponding limb jumps with great vivacity; if previously in extension, it momentarily assumes a state of flexion, and *vice versâ*. Occasionally, when one leg is thus excited, its fellow is, at the same time, similarly affected, but not so powerfully. The muscular contraction thus excited is very powerful; it is quite involuntary, and cannot be modified in any way by influence of the will. When any other part of the body is pinched no analogous movements are induced; but when the patient voids his urine, both legs are always affected in the same way as by pinching their integument. When the legs have been much stimulated by pinching, they become affected with a quivering motion, which lasts some minutes: this also occurs after micturition; no pain whatever in the legs, nor sense

of fatigue; calves stout and developed; dejections voluntary. There is curvature of the spine, formed by prominence of the dorsal vertebræ, from the fourth to the ninth, inclusive. Motility and sensation perfectly natural in all parts of the body, other than the lower extremities. General health not much impaired. Soon after this the legs became less rigid, and on the 24th of March were observed to be quite placid; convulsive movements could still be excited, by pinching or tickling, but were much more feeble than before.

In the beginning of April profuse hæmoptysis took place, and was soon followed by other symptoms of phthisis; large sloughs formed on the sacrum and hips; he wasted rapidly, and died much emaciated, on the 3rd of May. His intellect had continued unimpaired; the lower extremities quite deprived of voluntary power, but with sensation unaffected; and slight convulsions in the legs could be excited to the last.

On examination, after death, the curvature of the back was found to be formed by prominence of the dorsal vertebræ, from the 5th to the 9th, inclusive, the 7th being the most prominent.

On dividing the vertebræ, the laminæ of those corresponding to the curvature were found somewhat softened, especially on the right side. As soon as they were divided, a small quantity of yellow pus oozed from the right side of the spinal marrow, exterior to the dura mater. The dura mater, for the space of an inch and half, corresponding to the most

projecting portion of the spine, had a dark, greyish, stain, externally, and was much more vascular than the portions above or below the curvature, which were pale and quite natural in appearance. Below the curvature, however, the dura mater was distended by transparent serous fluid. The diameter of the cord was considerably smaller in the portion corresponding to the curvature, than in any other part throughout its whole length. The cord was removed contained in the dura mater, and the latter laid open in its posterior aspect. There was no pus in the sheath. The vessels of the pia mater were very tortuous, and much congested with florid blood in the parts above and below the curvature, but more so below, and less in the part corresponding to the curvature, than either above or below it. No change whatever in the appearance of the arachnoid, or of the inner surface of the dura mater.

The cord itself was of natural size; and a portion, about two inches in length, corresponding to the curvature, softened in the posterior columns. The tissue was not difluent, but became flaky and partially dissolved, when a small and gentle current of water was poured on it. This did not happen when a like current was similarly directed on other portions of the cord. This breaking down of the tissue was much more marked in the posterior than in the anterior columns, which were scarcely, if at all, softened, and resisted considerable traction. After the arachnoid had been removed, the posterior columns had still sufficient consistence to retain their form.

The affected portion was quite white, exhibiting no vascularity or bloody points. The nerves within the vertebral sheath, arising from the softened part, were firm, and of natural appearance. The cord, above and below, perfectly healthy, firm, and of good colour. When the contents of the chest were removed, an abscess was found, surrounding the bodies of the diseased vertebræ, its anterior wall being formed by the aponeurosis of the vertebræ. The abscess contained yellow, inodorous, grumous pus.

Both lungs offered grey granulations, and some tubercles, partially softened. The right lung was in a state of hepatisation.

REMARKS.

The absence of any feeling of fatigue in the lower extremities, after such a long period of muscular action, is very remarkable, and seems to show that fatigue is associated with the exercise of voluntary actions only. It is not felt in the sphincters. It is also worthy of remark, that the sensibility of the legs was unimpaired, although the posterior columns of the spinal cord were chiefly affected.

Extensive reflex actions, like those described in the preceding cases, are the most striking symptoms of apoplexy of the pons varolii. In an admirable article on apoplexy, in the "Dictionnaire de médecine et de chirurgie pratiques," M. Cruveilhier quotes from Ollivier the following instructive case:—

"A man, at work in the fields, complains all at once of acute pain and buzzing in his ears. He immediately runs off, as if to escape from threatened danger. He drops, and there is loss of consciousness; frequent, irregular, and noisy breathing; sometimes stertorous. He sneezes twice with violence; there is stiffness and convulsions of the limbs, alternating with a state of collapse; froth at the mouth, and an epileptiform condition. He dies at the end of five hours, and was not observed the last two. It was not determined whether or not sensation was abolished, but a convulsive movement of the right arm was observed when the skin of that limb was pinched, and a similar movement at the moment when the integuments were pierced in venesection."

M. Cruveilhier justly remarks, that these movements were no indication of sensation; and states, that he has often seen them independent of volition in paraplegia. This interpretation of the fact is, undoubtedly, the true one, and the convulsions in question were acts of the reflex function.

On examination after death, the pons varolii was found converted into a sac, full of blood, in part coagulated. The blood had found its way to the surface of the pons by a small lateral opening, and also into the fourth ventricle, which was distended with it.

M. Ollivier states, that he has since seen many examples of apoplexy of the pons, at the moment of

attack, and has always remarked convulsions of the extremities.

Since the account of the preceding cases has been in the hands of the secretary, my friend, Mr. Busk, has kindly furnished me with the details of all the cases of paraplegia from injury to the spine that have been received into the Seamen's Hospital, Dreadnought, during the last year. Some of these were attended with circumstances of uncommon interest, and were observed with great care. I shall therefore give a narrative of them as succinctly as I can without suppression of important circumstances.

CASE.

Thomas Colborne, aged twenty-six, was received into the Dreadnought the 14th September 1838, the day after he had fallen eleven feet into the hold of a vessel. He was rendered insensible for about twenty minutes by the fall, and did not know on what part of the body he alighted. On admission to the hospital the following circumstances were taken note of:—A puffy crepitant swelling about the last cervical vertebræ, with extreme tenderness, and acute pain on the slightest motion of the neck; total loss of voluntary power in the lower extremities, trunk, and hands; slight remaining voluntary power in the wrists; rather more in the elbows, and still more in the shoulders; less in the left arm than in the right. Fingers flexed; breathing abdominal; sensation much impaired in the hands and feet, especially in the lat-

ter; painful burning sensation in the back of the hands, without morbid appearance; erection and frequent motion of the penis; retention of urine; involuntary stools; intellect unimpaired; countenance natural; slight involuntary movements in the feet when the soles were tickled.

This man is still in the hospital (March 6th 1839), and in progress of recovery. The following is a succinct narrative of his case:—There was no return of voluntary power in the palsied parts until the 30th day after the accident, when Colborne was first able to move his right thumb a little, the fingers of the right hand, at the same time, feeling less stiff than previously. On the 39th day he was able to move these fingers freely, and also had voluntary power over the recti abdominis.

On the 69th day he regained some voluntary power in the lower extremities; could move the right foot and leg, and left great toe; and, on the 70th, could raise his heels several inches from the bed; but there had been no further increase of power in the hands and arms. There was little change, as regards voluntary power, from this time to the 95th day, when he was first able to stand with support, and enjoyed increased power in the hands. On the 101st day he could stand without support, and walk a short distance. On the 121st there was much increase of voluntary power; and, on the 141st, Colborne was able to walk about, resting his hands on the back of a chair, which he pushed before him. On the 30th day he first be-

came conscious of desire to pass urine and fæces; but the evacuations continued involuntary notwithstanding, being effected forcibly immediately after the desire was felt. On the 141st day he regained some control over evacuations from the bowels; and, on the 151st, they were quite voluntary; but the discharge of urine continues involuntary to this time.

During the period comprised in these observations, involuntary movements of the palsied parts could be easily excited. For the first seven days they were limited to slight movements of the feet, excited by tickling the soles, and could not always be induced. On the 9th day the movements excited in this way were much more powerful than before, and, from this to the 26th day, rapidly increased in power and extent, in the following order of progress:—At first, tickling one sole excited to movement that limb only which was acted upon; afterwards, tickling either sole excited both legs; and, on the 26th day, not only the lower extremities, but the trunk and upper extremities also. Tickling the left sole, where the cutis was denuded by a slight vesication, excited much more powerful and extensive convulsions than tickling the right sole; the convulsions excited by acting on the right sole being a constant tremulous motion. The convulsions in the right arm were always more powerful than in the left, where at first they could not be excited at all, and were, throughout, very feeble. Irritating the soles, by tickling or otherwise, was at first the only,

and always the most efficient method, by which convulsions could be excited. From the 26th to the 69th day, involuntary movements in all the palsied parts continued powerful and extensive, and were excited by the following causes:—In the lower extremities only, by the passage of flatus from the bowels, or by the contact of a cold urinal with the penis; convulsions in the upper extremities and trunk, attended with sighing, by plucking the hair of the pubes. On the 41st day a hot plate of metal was applied to the soles, and found a more powerful exciter of movement than any before tried. The movements continued as long as the hot plate was kept applied; but the same plate, at common temperature, excited no movements after first contact. The contact was distinctly felt by the patient, but no sensation of heat was perceived by him, although the plate was applied hot enough to cause vesication. Ice applied to the soles was also tried, but did not excite more powerful or more general convulsions than a body at common temperature; the ice did not cause any sensation of cold to the patient. Pricking the legs, or pulling their hairs, had a like effect to that of tickling the soles. Introduction of the catheter excited convulsions in the trunk and limbs, and convulsions also occurred during and preceding evacuation of the bowels; such evacuation being involuntary, but attended with consciousness of the act.

There were also frequent spontaneous twitches, unattended with pain, commencing in the heels, and

affecting the legs and arms, and the muscles of the trunk, as high as the ribs; violent spontaneous movements frequently followed long-continued efforts towards voluntary motion. At three different intervals Colborne took, for some days, one-eighth of a grain of strychnia three times a day. Great increase of susceptibility to involuntary movements immediately followed, and they were excited by the slightest causes: by sudden noise; by the passage of persons near the bed, or by the slightest touch of the coverlids; by blowing on the legs, and by various other slight impressions. Pulling the hair of the head excited strong convulsions in the arms, and tickling under the chin still more powerful ones. No convulsions in the upper extremities could ever be excited by irritating their integument. Spontaneous convulsions of the palsied parts were also more frequent and more powerful after the use of strychnia, and, for one day, the knees were observed in tonic flexion. On the 43rd day it was observed that, after the right fore finger had been excited to involuntary movement for about half a minute, it became transiently endowed with voluntary power, being, under all other circumstances, cut off from volition. The involuntary action of that finger was always greater than of any other.

It has been already stated, that the discharge of urine was involuntary, although the patient early felt desire to void it. At first the urine dribbled away almost constantly; but considerable quantity could, notwithstanding, be drawn off by the cathe-

ter. After the 95th day it was passed involuntarily, and with a sort of jerk, about every two hours. Up to the 62nd day priapism was generally present: it appeared to depend in great measure on the quantity of urine in the bladder; and if present before catheterism, it generally subsided immediately after. Once or twice it seemed to be excited by tickling the soles. On the first return of voluntary power, the patient was enabled to restrain, in some measure, the excited movements; but this required a distinct effort of the will, and the first attempts to walk were curiously affected by persistence of the susceptibility to excited involuntary movements. When he first attempted to stand, the knees immediately became forcibly bent under him: this action of the legs being excited by contact of the soles with the ground. On the 95th day this effect did not take place until the patient had made a few steps; the legs then tended to bend up, a movement which he counteracted by rubbing the surface of the belly: this rubbing excited the extensors to action, and the legs became extended with a jerk. A few more steps were then made; the manœuvre repeated, and so on. This susceptibility to involuntary movements from impressions on the soles gradually diminished; and, on the 141st day, as before stated, Colborne was able to walk about, supporting himself on the back of a chair which he pushed before him; but his gait was unsteady, and much resembled that of chorea. Sensation improved very slowly. On the 53rd day he could first slightly perceive the heat of

the metal plate; but the sense of contact was present long previously, although, up to the 121st day, there was much numbness in the soles, especially in the fore part. Sensation in the hands returned earlier, and was quite restored on the 121st day in all the fingers except in the little finger and ulnar side of the ring finger of each hand.

The general symptoms were at no time very alarming. There was some degree of fever for the first three weeks. On the 6th and 7th days, slight, transient delirium; but in the intervals the patient appeared happy, frequently laughing aloud. The pulse, on admission, was small, and only 48: it afterwards ranged from 60 to 72, and once was 84. On the 34th day it was observed that the pulse was 72, and regular, when the patient was recumbent; 92, small and irregular, when he was erect.

Breathing was difficult, and wholly abdominal, for more than a month.

The 26th day there was great improvement in general health. The appetite was good. This improvement suffered no interruption; and, on the 101st day, the patient had become quite fat, and his general health excellent.

The urine was observed to be alkaline, bloody, and charged with ropy mucus on the 3rd day; and, for nearly 60 days afterwards, it was generally ammoniacal, and often contained much ropy mucus; sometimes pus and clots of blood.

For some time after Colborne had sufficiently re-

covered to walk with crutches, violent spontaneous convulsions came on every night soon after he had gone to bed. These convulsions were prevented, or, if present, immediately quieted by giving him three or four drops of hydrocyanic acid, or twenty-five drops of tincture of digitalis.

This very important case suggests a long train of reflections. The convulsions of the palsied parts were clearly of the same nature as those observed in the preceding cases. Their independence of sensation was curiously shown by the difference of effect from the application of a heated plate, and of the same plate at common temperature, although the difference of heat in the two cases was not felt by the patient, the sense of contact being all that was perceived. This continuance of the sense of contact, while that of temperature was completely lost, is a novel and interesting illustration of the speciality of sensations; a subject so ably treated by Sir C. Bell.

The great power of heat, as an excitor of involuntary movements, is also a fact* of intrinsic interest. Not less interesting was the circumstance, that convulsions could be readily excited by impressions on surfaces above the seat of injury; as, by pulling the hair of the scalp, by sudden noise, and so on. This is proof of two important points: first, that a lesion of the cord may be such as to intercept the transmission of voluntary influence, and yet allow the transmission of that reflected from incident nerves.

* This was first observed by Mr. Grainger.

Secondly, that all influences from impressions on incident nerves, are diffused through the cord; for, in the instance adduced, the reflected influence was undoubtedly not deviated into the cord by the morbid condition of that organ, but followed its natural course of diffusion, being rendered manifest in this case by the convulsions which were excited in consequence of increased activity of the motor function of the cord; it must be borne in mind, that the diffusion of this influence took place, not in its course towards the cerebrum, but downwards through the cord. The fact is of great interest in physiology, and fertile in applications to the study and treatment of disease. It was long ago distinctly stated by Broussais, and in relation to the phenomena of mind, was developed with singular ability by that celebrated physician.*

The dependence of priapism on distension of the bladder, (if real) in this case, shows that impressions on incident nerves may be reflected so as to cause organic processes, in the same manner as to excite muscular contraction.† The connection of this with the subject of sympathies is as interesting as it is obvious.

The periodic discharge of urine in Colborne's case, seems to show that distension is the chief mode of excitement to reflected movements, in cavities with a muscular coat. The inability to excite convulsions

* Traité de la Physiologie appliquée à la Pathologie. 1823-24.

† The reader is referred to Müller's Physiology for proof, that erection is caused solely by vascular turgescence.

in the upper extremities, by irritating their integument, must have been owing to some lesion of the incident fibres of their nerves, as convulsions were readily excited in the arms, by impressions on other surfaces. The superior activity of effect from impressions on the soles, in this and other cases, is interesting on account of its generality. The limitation to the palsied parts of convulsions excited by the use of strychnia is quite general.

It is important to remark, that but very slight convulsions could be excited immediately after the accident, and that they gradually increased in extent and power.

The fact, distinctly observed, that one of the fingers became transiently endowed with voluntary power, after it had been some time excited to involuntary action, although difficult to interpret in the present state of science, is likely to acquire importance as our knowledge of this subject advances.

The ropy matter observed in the urine, was probably not mucus, but pus, altered by the action of ammonia. From a comparison of this case with the following, and with some others I possess, I am inclined to question the correctness of the theory which ascribes the alkalinity of the urine to an alteration in the function of the kidney, caused by deficient or altered innervation. I rather believe it to be the consequence of retention of the urine, in presence of the morbid secretions of an inflamed bladder.

CASE.

Adolphe Brandt, aged 43, was received into the Dreadnought three hours after having fallen into the hold of his ship; a fall of twenty feet. On admission the following circumstances were noticed:—a trifling scalp wound on the back of the head; contusion of the right ancle; considerable projection of the spine, above the tenth dorsal vertebræ; total loss of motility in the lower extremities; sensibility exalted in the integument of the flanks; natural in the thighs; diminished in the legs, and there attended with pricking and tingling. Penis, semi-erect.

In the evening of the third day from the accident, the lower extremities, for the first time, became susceptible of excited movements. By tickling the soles the whole of the left limb, but only the toes of the right, were excited to brisk involuntary movements. The patient was unconscious of these movements, otherwise than by sight. This continued without change, until the 9th day, when it was observed that the movements were limited to the toes in both feet, and that, after being produced a few times, they could not be further excited without considerable interval of rest. From the 9th day they gradually diminished in force and extent: could not be excited in the right limb after the 16th day, nor in the left after the 22nd. Voluntary power increased, exactly as the susceptibility to excited involuntary move-

ments diminished. The first return of voluntary power observed, was on the 9th; it was very trifling, and confined to the muscles of the hips and thighs. On the 12th there was transient voluntary power in the right foot; on the 22nd power to move the toes of both feet. Voluntary power increased rapidly from the 22nd, and, on the 29th, Brandt was able to sit up half an hour.

Expulsion of urine was involuntary to the 5th day; afterwards, quite voluntary; but the stools were passed unconsciously until the 18th day.

The urine was ammoniacal, for the first time, on the 8th day; on the 12th it was very much so, and loaded with muco-purulent fluid, continuing so to the 16th, from which time it became less alkaline, and after the 23rd was quite natural and clear.

The sensibility of the integument of the flanks, and lower part of the belly, continued exalted to the 22nd; that of the legs perverted still longer. On the 2nd day the pulse was 84, but afterwards increased in frequency, and continued at 100, or 108, up to the 9th day. There was profuse diarrhœa from the 5th to the 14th day, and much emaciation; the muscles of the legs and thighs much wasted, soft and flaccid.

From the 15th day Brandt improved much in general health, and on the 55th day his health was considered quite good, but as voluntary power in the lower extremities was still feeble, one-eighth of a grain of strychnia, three times a-day, was ordered. Spontaneous convulsions ensued, generally coming on at

night, when the patient was on the point of sleeping. They affected the thighs chiefly, beginning in them, and passing up the muscles of the trunk towards the chest. After this Brandt rapidly gained strength in the lower extremities, and on the 115th day, when he left the hospital, he was able to walk without support, but stooped much, and had a marked angular projection at the lower part of the spine. His urine, though in appearance natural, became ammoniacal soon after it was voided. It was passed without difficulty, and there was no incontinence.

Many of the remarks I have made on the former cases, apply so obviously and so exactly to this one, that I think it unnecessary to repeat them. It is important to remark, that no involuntary movements could be excited for the first three days after the accident.

John Bennett, aged 47, on the 1st of December 1838, fell about six feet, into the bottom of a barge, and was stunned for a short time. He did not know on what part he alighted, but it was said to be his head; was brought to the Dreadnought immediately after the fall. About half an hour after admission the following circumstances were observed. No mark of injury on the person, except a slight bruise on the patella; no pain, except in the back of the neck, where there was much tenderness on pressure on the spinous process of the 5th cervical vertebra; no pain of head. Pupils natural; and senses, except that of touch, unimpaired. Was able to move the head slightly from side to side. In the upper extremities

all voluntary power lost, except very slight in the shoulders. Total loss of voluntary power in the trunk and lower extremities. Breathing abdominal, priapism present, and continuing after the use of the catheter. Sensation much impaired below a line level with the mammæ, but sufficient remained in the lower extremities to distinguish when any part of the feet or toes was touched; but the sensation communicated was that of pricking: sensation, not less impaired in the hands; more so in the left than in the right: could distinguish each finger of the latter, but not of the former.

Tickling the soles excited slight contractions of the extensors of the leg and toes, confined to the muscles of the limb acted upon; more extensive in the right than in the left leg. This susceptibility was soon exhausted, and required rest for its recovery. A hot plate, though sufficiently hot to cause vesication, did not excite more powerful or more extensive movements than the same plate at common temperature. A slight sensation of warmth was perceived; pulse 48; inspirations 13; calm and without rattle. When first admitted, sensation was completely abolished in the palsied parts, and no involuntary movements could be excited.

This man died seven days after the accident, and in the interval the following variation in the symptoms above described, was observed.

On the 4th day the involuntary excited movements had somewhat increased in power. On the morning of the 5th day sensation was nearly extinct

below the umbilicus; when touched on any point, the sensation was referred to some other; for example, when the sole of the left foot was touched, the sensation was referred to the right knee or some other part. There was no trace of involuntary movements. Priapism absent; bladder kept itself empty, or nearly so. In the evening there was slight sensation in the inside of the leg, and in the sole of the right foot, and when the hollow of that sole was rubbed, or the hot metal applied to it, one slight convulsion was excited, which could not be repeated until after an interval of rest. A slight sensation of warmth was perceived when the hot plate was applied. Sensation quite extinct in the left lower extremity, and no susceptibility of excited movements.

On the 6th day sensation was extinct in the fore arm and hand; slight in the upper arm; slight in the trunk, from the mammæ to the lower edge of the ribs; slight sensation in the inside of the right thigh, and in the sole of the right foot, but quite extinct elsewhere in the lower extremities. Irritating the right sole excited one feeble convulsion in the right thigh and leg; irritating the left sole had no effect. There was no priapism, nor was it induced by catheterism, although this operation was felt by the patient. Cold water injected into the bladder was rejected with force. Stools involuntary; sphincter ani moderately contracted. On the 7th day sensibility was completely extinct below the umbilicus, and involuntary movements could not

afterwards be excited. No involuntary movements could ever be excited in the upper extremities, by tickling the hands or otherwise.

The intellect continued unimpaired until the 7th day, when there was some wandering, the patient being rational, however, when roused. The pulse was then 84, breathing 28, without rattle. In the evening he became comatose, with stertorous breathing and contracted pupils, and at 8 P.M. he died.

The urine was slightly alkaline on the 4th day only.

Examination of the body, 15 hours after death:

Body rigid and in excellent nutrition.

Spine. Slight ecchymosis of the deep muscles on the posterior and anterior aspects of the cervical vertebræ. Bodies of the 4th and 5th cervical vertebræ broken transversely; left side of the arch of the 4th vertebra fractured, and the articular ligaments between it and the 5th lacerated. Arch of the 3rd vertebra broken on both sides. The ligamentum subflavum, between the arches of the 4th and 5th vertebræ, nearly detached from the latter; dura mater of the cord uninjured; the cellular tissue external to it, slightly reddened, from infiltration with blood. On dividing the dura mater longitudinally on its posterior aspect, the surfaces of the arachnoid were found adhering by numerous very slender filaments, but there was no vascularity nor opacity of the latter membrane. The vessels of the pia mater were full, but that membrane was in its natural state, and, as well as the arachnoid, free from

laceration. Externally, the cord exhibited no visible lesion, except a small reddish spot anteriorly, opposite the 4th vertebra, giving an indistinct appearance of ecchymosis; but, in a small space opposite the same vertebra, the cord felt very soft, and on being divided longitudinally from the posterior aspect, its interior was found converted into a red semi-fluid pulp, which approached very nearly the anterior surface, and was the cause of the spot seen there externally. A considerable thickness of firm white matter existed posteriorly between the surface of the cord and the red pulpy matter of the interior. A much thinner layer of white matter remained anteriorly. The interior of the cord was converted into red pulpy matter, for the extent of one inch and a quarter, the middle of this space being exactly opposite the root of the 5th cervical nerve, that nerve, namely, which passes out between the 4th and 5th vertebræ. When the cord was removed from the vertebral canal, the anterior surface of the latter presented a trifling projection, corresponding to the junction of the bodies of the 4th and 5th vertebræ. The arches of the vertebræ had not been displaced so as to encroach on the diameter of the canal.

Head not opened.

Lungs slightly congested posteriorly, but otherwise quite natural.

No morbid appearance in the abdominal viscera.

Kidneys of a purplish colour, otherwise quite natural.

Mucous membrane of the bladder pale and smooth,

excepting a small patch on the posterior surface, exhibiting vascularity.

The only points I wish to notice in this case at present, are, that the excited movements were much more feeble at first than a few days after the accident, and that the priapism was not removed by catheterism.

In two other cases of paraplegia, from injury to the spine, which were observed by Mr. Busk, involuntary movements could not be excited at all. In one of these there was only partial loss of voluntary power, occasioned by a blow on the loins and sacrum; in the other the shock and injury were very great, and the patient died 68 hours after the accident, so that it is probable the lower part of the cord had not recovered from the concussion received.

Mr. Grainger has also kindly sent me some interesting cases of paraplegia, attended with susceptibility to excited movements in the palsied limbs; but as they do not establish any facts other than those observed in the cases already related, I refrain from giving their details, being unwilling to occupy further the time of the Society.

The following is a summary of the leading facts observed in the preceding cases, and of the inferences that may be drawn from them.

1st. That the involuntary movements excited in the palsied limbs, were the same in kind as those observed in decapitated animals.

2nd. That these movements were quite independent of sensation, and that they varied in extent

and force, inversely with the degree of voluntary power possessed by the affected limbs; being the most forcible when the loss of voluntary power was complete, and diminishing gradually in extent and force as that power increased.

Here is the place to inquire whether this susceptibility to involuntary contractions in muscles that do not commonly exhibit it, was owing to increased activity in the motor function of the cord, excited by the irritation of the injury, or was merely the consequence of the withdrawal of volition. *A priori*, it would seem that the mere withdrawal of volition would be sufficient to create this susceptibility; that the motor power of the cord not being expended by volition, would accumulate so as to become excited to action, by impressions on incident nerves,—the normal mode of action in involuntary parts,—and that those muscles which generally act under the influence of volition, would thus be excited to involuntary contraction. But in hemiplegia from hemorrhage on the brain, it rarely happens that involuntary contractions can be excited in the palsied limbs, though the loss of voluntary power be as complete as in the cases I have described; this is not conclusive, however, against the hypothesis, because the analogy between the cases is not complete. I infer, therefore, that these involuntary contractions, when powerful and extensive, are evidence of increase of motor power in the cord, which the withdrawal of volition in some measure favours; but that in the cases I have related, it is probable from the nature

of the lesions, as also from the appearances observed in the fatal cases, that irritation of the cord was the main cause of increased activity of its motor function.

3rd. Irritating one leg generally caused movements in that leg only; in some cases it caused movements, but more feeble ones, in the other leg also, and in the arms when they too were paralysed: facts completely analogous to those observed in decapitated animals.

4th. Impressions on the soles were more efficient than any that were tried on other parts of the skin in exciting involuntary movements; and heat, although not producing sensation, was a powerful means of excitement.

5th. In one case, impressions on nerves arising above the seat of injury, excited convulsions in parts receiving their nerves from below; a fact which proves, that influences from impressions received on incident nerves, at any point, are diffused through the cord. This leads me to remark that convulsions are rarely, if ever, spontaneous, in the strict sense of that word, for the multitude of impressions constantly received on the surface, especially in the mucous membranes, are probably sufficient, when the motor function of the cord is much exalted, to excite all those convulsions usually called spontaneous.

6th. That the convulsions observed were not associated with a sense of fatigue, but that the power which caused them was subject to exhaustion,

and renewed by rest. In cases of injury to the spine, some time elapsed before the palsied parts exhibited involuntary movements; this was probably owing, in some measure, to concussion of the cord, for in decapitated animals these movements may be instantly excited.

7th. Strychnia given internally increased the susceptibility to involuntary movements, and caused spontaneous convulsions that were limited to the palsied parts.

Prussic acid, as well as tincture of digitalis had a decided effect, in one case, of suspending or quieting spontaneous convulsions.

8th. That the dependence of priapism on distension of the bladder, observed in one case, tends to show that external impressions may be reflected by the spinal cord, so as to excite organic processes,—such as, vascular turgescence,—in the same manner as to excite muscular contractions.

I shall now notice a circumstance in the pathology of tetanus, which gives that disease a link of connection with the preceding cases, and which has been overlooked by many physicians, and has received from none the attention it deserves: I allude to the fact that the convulsions of tetanus, when already present, are rendered much more powerful by impressions made on the skin or senses, and when absent, as in the intervals which usually occur, may invariably be excited by such impressions. The fact is stated by Dupuytren in his "Leçons sur les plaies par les armes à feu," in the following words:—

"L'intelligence des malades reste ordinairement saine; rarement il survient du délire. Cependant la sensibilité est très developpée, et à mesure que la maladie marche, ou la voit s'accroitre de plus en plus, et se monter à tel point que le moindre bruit, la moindre sécousse, les plus faibles émotions suffisent pour la mettre en jeu et faire entrer le système nerveux, et le système musculaire qui est sous sa dépendance dans un état de convulsion."

It is therefore of great importance in the treatment of this disease, to avoid multiplying impressions, especially those of a painful kind. In this point of view, the practice of applying leeches repeatedly, and in great number, is very objectionable, for it is not questionable that the evil here alluded to is not compensated by any ascertained advantage. Repeated cupping, blistering, and also repeated purging—means often employed—are open to the same objection. While on this topic I may be allowed, also, to question the propriety of giving opium in the treatment of tetanus. It has been ascertained that the effect of that drug is to excite, and not quiet, the motor function of the spinal cord; indeed, it is well known that the motor acts of the cord may be rendered much more active and powerful by giving, before decapitation, opium to animals that are to be subjects of experiment. Believing that, after ample trial, experience has not established any advantage in the use of opium, I consider these objections, furnished by theory, to be motives sufficient for its future exclusion from the treatment

of tetanus. If in the choice of remedies we are to be guided at all by physiological considerations, it is much more rational to seek for remedies for tetanus in that class of substances known to exercise sedative influence on the motor function of the cord. I may mention hydrocyanic acid, conium, and digitalis, as deserving more ample trial than has yet been given them.

Hitherto, the treatment of tetanus has been conducted in violation of all known physiological principles: it is to be hoped that our improved knowledge of the functions of the spinal cord will at length lead us to discovery of more successful methods.

MEMOIRS

ON SOME

PRINCIPLES OF PATHOLOGY

IN THE

NERVOUS SYSTEM.

By MARSHALL HALL, M.D., F.R.S., L. & E., &c.

READ APRIL 9TH, 1839.

MEMOIR I.

On the Condition of the Muscular Irritability in Paralytic Limbs.

From numerous subjects of investigation in reference to the Pathology of the Nervous System, I have selected, for the present communication, that of the condition of the muscular irritability in paralytic limbs.

The utmost discrepancy of opinion prevails amongst physiologists and medical writers upon this subject. Prochaska, Nysten, and Legallois state, that the irritability of the muscular fibre remains in paralytic limbs; whilst Professor Müller and Dr. Sticker assert the contrary. No attempt has been made to reconcile a contradiction not very honour-

able to our science. To explain this discrepancy of opinion is one of the objects of this communication.

The authors to whom I have referred, misled by the generic term and idea of paralysis, have not sufficiently distinguished between its different species. Yet it will be found, as we proceed, that this distinction is of the utmost importance in the explanation of the phenomena. In fact, cerebral paralysis, or that which removes the influence of the brain, and spinal paralysis, or that which removes the influence of the spinal marrow, are in totally opposite conditions in reference to the irritability of the muscular fibre in the limbs severally affected; facts equally obvious in experiments and in clinical observations. I must begin this paper by quotations of some length, for these are necessary to show the present state of the science. I shall then proceed to the detail of my own investigations.

The first distinct notice of this subject which I think it necessary to adduce, is contained in the following extract from the Opera Minora of Prochaska:* "Vis nervosa quæ in nervis a commercio cum cerebro separatis superest, non unâ alterâve musculi contractione, quam irritati cient, exhauritur, sed millenis plane convulsionibus excitandis par est; quod expertus sum in ranâ, cui medullam spinalem in dorso abscidi. Supervixit huic vulneri aliquot diebus; interim irritando medullæ spinalis partem eam, quæ erat infra sectionem, convulsiones in artubus inferioribus excitavi toto tempore, quo super-

* Ed. 1800, p. 84.

vixit, planè innumeras; neque extremitates inferiores prius mortuæ sunt, quam tota rana; Dein quod vis nervosa in nervis diu persistere possit citra cerebri auxilium probare videntur musculi paralytici, in quorum nervis ob compressionem aliquam præternaturalem totum commercium cum cerebro sublatum est, nihilominus tamen à stimulo electricæ scintillæ longo jam tempore paralytici musculi convelluntur."

More detailed remarks were made by Nysten, and these, from being founded upon very distinct post-mortem experiments on the human subject, have excited more attention. This celebrated physiologist observes, "Chez deux apoplectiques qui avaient succombé au bout de quelques jours, l'un à la prémière attaque et l'autre à la seconde, le galvanisme a déterminé des contractions aussi fortes dans les muscles du côté sain que dans ceux du côté paralysé: les iris des deux côtés sont également contractées." "Cette propriété n'a été complètement anéantie dans les organes musculaires des deux sujets qu'environ 12 heures après la mort; et on n'a observé aucune différence dans les muscles paralysés."*

Legallois makes similar remarks, founded upon experiments made upon animals. He observes, "M. Nysten a montré que dans les paralysies les plus complètes, l'irritabilité se conserve dans les membres paralysés tout aussi bien que dans ceux

* Recherches Physiqlogiques, 1811, p. 369; compare p. 377 and 419; and Cuvier, Histoire des Sciences Naturelles, tome i. p. 213.

qui ne le sont pas. J'ai obtenu un résultat semblable d'une expérience que j'ai souvent répétée. Elle consiste à détruire la moëlle lombaire dans un lapin âgé de moins de dix jours; il faut le choisir de cet âge, pour que la circulation ne soit pas arrêtée, et qu'il puisse continuer de vivre. Quoique dans cette expérience, le train de derrière soit frappe de mort, et que ses nerfs ne puissent plus recevoir aucune influence de la moëlle épinière, l'irritabilité s'y conserve, et l'on peut, pendant fort long-temps, faire contracter les cuisses, en irritant les nerfs sciatiques. Il parait donc qu'il se fait dans toute l'étendue des nerfs une sécrétion d'un principe particulier." *

From these quotations from Nysten and Legallois we should be led to the conclusion that the muscles of paralytic limbs, in all cases of hemiplegia and of paraplegia simply retain their irritability. From another series of observations, made by philosophers equally worthy of our confidence, we should be led to an opposite conclusion.

Some interesting experiments on this point have been recently performed by Professor Müller and Dr. Sticker. The former† celebrated physiologist observes, "It was known that, after the division of a nerve, the portion cut off from communication with the brain retains, for a certain time, its excita-

* Œuvres de Legallois, éd. 1824, p. 23 and 24.

† See the excellent translation of the "Handbuch der Physiologie," by William Baly, M.D., vol. i., p. 631—633; and compare p. 663, 724, 727, 898, &c., and Grainger on the Spinal Cord, p. 96, 97.

bility; but the question, how far the continuance of the connection with the brain and spinal marrow is necessary for the longer preservation of the irritability of the nerves, and whether the muscles retain their irritability when their nerves no longer communicate with the central parts of the nervous system, could not hitherto be answered with certainty, and had indeed been seldom mooted. Nysten had asserted that the muscles of patients who died a short time after an apoplectic seizure preserved their irritability, and contracted under the influence of the galvanic stimulus, although the functions of the brain had been paralyzed.

"I had good reasons, however, for believing that, in such cases, the nerves retain their power only for a short time, losing it entirely after a longer interval; for, in experiments on the reproduction of the nervous tissue in a rabbit, I had once observed, that the lower portion of the nervus ischiadicus, which I had divided some months previously, had lost all its excitability; and a similar fact had been before observed by Fowler. I have since performed, in conjunction with Dr. Sticker, new experiments, which have completely confirmed that supposition. To prevent the regeneration of the nerves, and to withdraw more effectually the lower portion from the influence of the brain and spinal cord, a portion of the nerve (the ischiadic) was entirely removed. The experiments were made only on two rabbits and a dog; yet the results were so constant, that they are quite worthy of dependence.

"Eleven weeks after the division of the nerve in the first rabbit, it was laid bare in its course between the biceps and semitendinosus muscles. Contrary to expectation, and to our mortification, the continuity of the nerve was found to be restored. It was divided anew below the cicatrix; and it is remarkable that, although the animal uttered a loud cry, the section excited no contraction of the muscles. The lower portion of the nerve was now exposed to the galvanic stimulus of a single pair of plates, was cut and pulled in every possible way, but not the slightest muscular contraction was excited.

"For the sake of comparison, the nerve of the opposite side was divided, when the animal showed signs of suffering the most severe pain, and violent muscular spasms took place; and, after the division, very slight irritation of the nerve itself, that is to say, of the lower portion of it, or merely of the muscles, excited strong twitchings, even after death.

"Ten weeks after the division of the nerve in the dog, the ends were found to be reunited. The experiment was performed exactly as in the rabbit, and the result, as to the effect on the nerve, was entirely similar: it had lost all its excitability; but the muscles still contracted slightly when stimuli were applied directly to them immediately after death: however, this remaining irritability was gone, while, in the muscles of the opposite leg, the strongest contractions could be excited.

"Five weeks after the nerve had been divided in the second rabbit, we proceeded to examine its state,

and were the more interested on account of the short time that had elapsed since its division. The ends were not united; they were somewhat swollen, and connected with the surrounding cellular tissue. In the other instances, the portion of nerve removed measured about four lines only; here its length was eight lines. No contraction of the muscles could be excited by irritating the nerve either mechanically or by a chemical stimulus, caustic potash, or by galvanism; nor by irritating the muscle itself, although the rabbit had plenty of vital power. On the left side the muscles were found irritable, as in the other cases, both before and after death.

"The foregoing experiments prove, at least, that when the communication of the nerves with the brain is wholly cut off, they gradually lose the power of exciting the muscles to contraction, while the muscles lose their irritability. The result would, however, have been still more decisive if, in place of a single pair of plates, a small galvanic battery had been employed to stimulate the nerves and muscles. That, and that alone, would have enabled us to determine with certainty whether all the power of the muscles, in two of the cases, had been lost. The experiments as they were made, however, prove distinctly enough the necessity of communication with the brain for the preservation of nervous and muscular power. We may from them conclude also that if, after the division of a nerve, the excitability of the lower portion, and the irritability of the muscles are restored, the nerve has itself been completely

reproduced; and that this has not been the case if the nerve and muscle do not retain their vital properties."

I may here observe, that an experiment, similar to those of Professor Müller and Dr. Sticker, in which Sir Astley Cooper assisted the late Dr. Haighton, was made in this country many years ago, but never published. The sciatic nerve was divided in a dog. In a few days the lower portion had lost its power of exciting muscular contraction.

These statements appear, then, sufficiently opposed to each other; how shall we explain or reconcile them? Before I proceed to discuss this question, I must beg the attention of the Society to a third series of observations and experiments, in a certain sense at variance with both those which have been detailed.

My own attention was first drawn to this interesting point by the fact, well known to physicians, that if we administer strychnine to patients affected with paralysis, it is frequently the paralytic limbs which first manifest the peculiar influence of this powerful remedy. M. Fouquier has, I believe, too hastily generalized this effect of strychnine on the muscles of paralytic limbs. And how well do I remember the same remark being made by M. Louis, as, in our visit round his wards at La Pitié, we came to a case in point. From that moment I did not cease to revolve the question in my mind, and to devise modes of observation and experiment to solve it. Certainly the conclusion of

M. Ségalas d'Etchepare in regard to it, is anything but satisfactory. M. Ségalas observes:—

"Ces expériences réunies autorisent donc à conclure que le tétanos produit par la noix vomique a pour condition première de son développement la présence du poison dans le sang, et que les phénomènes qui l'accompagnent sont dus à l'action anormale de ce fluide sur le système nerveux."

"Cette manière de considerer l'action de la noix vomique donne un moyen simple d'expliquer les effets de cette substance chez l'homme, et particulièrement ce fait si remarquable de la contraction des muscles paralysés plus prompte et plus énergique que celle des muscles sains, fait observé d'abord par M. Fouquier,* et constaté depuis par tant de praticiens du premier ordre. Il est facile, en effet, de concevoir que les muscles sains, soumis à la fois à l'empire du cerveau et à l'action du poison, résistent à celle-ci plus que les muscles paralysés, qui, soustraits à l'influence cérébrale, ne sont plus commandés que par le poison."

Upon these observations of M. Ségalas, M. Ollivier remarks — "Mais s'il en est ainsi, comment se rendre raison d'un fait observé depuis long-temps par tous les praticiens, et sur lequel je viens d'appeler l'attention, c'est que la noix vomique cause souvent de violentes douleurs dans les membres paralysés, sans apporter aucun trouble dans les parties saines? Pourquoi cette action spéciale sur

* Memoire sur l'emploi de la noix vomique dans les paralysies, par M. Fouquier; 1815.

les seuls organes paralysés? et, d'un autre côté, la douleur perçue ne prouve-t-elle pas que les parties paralysées ne sont point isolées entièrement du centre nerveux, et qu'ainsi ce ne peut être à cette inconstance qu'on doive attribuer la localisation singulière des effets de la strychnine?"*

It will soon be seen that this view, like a former one, is far too general, far too indiscriminate—that it is not in every case of paralysis, that the strychnine would first display its influence on the paralytic limbs. Meantime, however, I figured to myself the fact of the strychnine acting on the spinal marrow, and diffusing its power equally along the nerves, to the right hand and to the left, to the muscles to which they proceed respectively; and I asked myself the question—Is the difference observed in its ultimate effects on those muscles, the power being obviously the same, owing to a difference in the degree of the irritability of the muscular fibre itself? Is the irritability of that fibre actually augmented? If so, the phenomenon would be explained!

I waited with anxiety for opportunities of submitting this question to the decision of experiment. This I entrusted, in the first instance, to my young friend and intelligent pupil Mr. Dolman. The result was as I anticipated. A little child, aged two years, was perfectly paralytic of the left arm. The slightest shock of galvanism was directed to be applied which should produce an obvious effect. It was uniformly observed that the paralytic limb was agitated by a

* Traité de la Moëlle Epinière, 1827, p. 841.

degree of galvanic energy which produced no effect on the healthy limb.

A similar patient, with paralysis of one leg, was subjected to the same experiment by my friend and former pupil Mr. W. F. Barlow, and with the same result.

I repeated the trial on several patients affected with hemiplegia, at my own house, uniformly with the same event: the paralytic limbs were always moved by an influence which was lower than that required to affect the healthy limb, or if both limbs were agitated, it was uniformly the paralytic limb which was more shaken than the other.

I next repeated my observations upon a more extensive scale, at the St. Mary-le-bone and St. Pancras infirmaries. There were two exceptions to the rule; whilst the numbers in which the phenomena already described were observed, were considerable.

These exceptional cases I shall notice particularly hereafter. I must now remark that these observations seem, even more than those of Prochaska, Nysten, and Legallois, at variance with the experiments of Professor Müller and Dr. Sticker. Before I proceed to discuss this question I must, however, detail some experiments of my own.

They were made on six frogs. I divided the spinal marrow immediately below the origin of the brachial plexus; and I removed a portion of the ischiatic nerve of the right posterior ex-

tremity. I had immediately, or more remotely, the following interesting phenomena.

1st. The anterior extremities alone were moved spontaneously; both posterior extremities remaining entirely motionless, when the animal, placed on its back, made ineffectual efforts to turn on the abdomen.

2nd. Although perfectly paralytic in regard to spontaneous motion, the left posterior extremity, that still in connexion with the spinal marrow, moved very energetically when stimulated by pinching the toes with the forceps.

3rd. The right posterior extremity, or that of which the ischiatic nerve was divided, was entirely paralytic, both in reference to spontaneous and excited motions.

4th. After the lapse of several weeks, whilst the muscular irritability of the left posterior extremity was gradually augmented, that of the right was gradually diminished, phenomena observed when the animal was placed in water, through which a slight galvanic shock was passed accurately in the direction of the mesial plane.

In this interesting experiment we have, then, first the phenomena of loss of spontaneous motion on removing the influence of the brain, the excited or reflex actions remaining; and the loss of these on removing the influence of the spinal marrow; secondly, in the case of mere cerebral paralysis, we have augmented irritability, and in that of the spinal marrow we have the gradual diminution of this property.

5th. Strychnine being now administered, the anterior extremities and the left posterior extremity, or that still in connexion with the spinal marrow, became affected with tetanus; but the right posterior extremity, or that severed from all nervous connexion with the spinal marrow, remained perfectly flaccid.

6th. Lastly, the difference in the degree of irritability in the muscular fibre of the two limbs was observed when these were entirely separated from the rest of the animal.

In a word, the muscles of the limb paralysed by its separation from both cerebrum and spinal marrow, had lost their irritability; whilst those of the limb separated from its connection with the cerebrum only, but left in its connexion with the spinal marrow, not only retained their irritability, but probably possessed it in an augmented degree. The next question came to be,—Do these phenomena obtain in the human frame? I visited a patient affected with hemiplegia, including paralysis of the face, and I passed a slight galvanic shock through two pieces of metal, of which one was placed over each cheek. The muscles of the paralytic side were most affected. I repeated the experiment with the same result. I now compared with these, two cases of injury of the facial nerve, passing the galvanic shock in the same manner, through the fibres of the orbicularis: it was now the muscle of the healthy side which was affected by the galvanism, the eyelid of that side being closed, whilst that of the paralytic side gaped

as before. I next compared the effect of galvanism in two cases of complete paralysis of the arm, one hemiplegic, the other the result of dislocation of the shoulder. The muscles of the former were more, those of the latter less, irritable than those of the healthy arm respectively, as were also those of the arm of a patient affected with the paralysis induced by lead. Lastly, I compared the cases of paralysis of the lower extremities, one arising after pertussis, and therefore cerebral, the other, I think, from disease within the lumbar vertebræ: in the former there was augmented, in the latter, diminished, irritability.

By means of these experiments and observations we are enabled, I believe, to explain all the apparent discrepancies between the statements of former authors, and between each of them and my own.

The observations of Nysten, and others, determined that the irritability of the muscular fibre still existed in ordinary hemiplegia; but they did not extend far enough to determine the comparative degree of irritability of the paralytic and of the healthy limbs, or the question whether, in the former, the irritability was diminished—the event probably expected—or augmented, a result, I believe, never anticipated.

Prochaska and Nysten and Legallois failed in their experiments, too, by not allowing time for the change in the condition of the irritability of the muscular fibre to take place.

Professor Müller and Dr. Sticker, on the other hand, did not distinguish between paralysis arising

from separation from the cerebrum merely, and paralysis arising from separation from the spinal marrow, a distinction of the utmost importance in every point of view, and that which explains the phenomenon under discussion. The term paralysis has been used by all the authors whom I have quoted, in too general a sense. This is so true that I may affirm that in one kind of paralysis, that which removes the influence of the cerebrum, and which is therefore paralysis of spontaneous or voluntary motion, there is augmented irritability; whereas in the other, that which severs the influence of the spinal marrow, the irritability is diminished or even annihilated.

We may conclude that, in cerebral paralysis, the irritability of the muscular fibre becomes augmented, from want of the application of the stimulus of volition; in paralysis arising from disease of the spinal marrow and its nerves, this irritability is diminished, and at length becomes extinct, from its source being cut off.

We may further deduce, from the facts which have been detailed, that the spinal marrow, and not the cerebrum, is the special source of the power in the nerves of exciting muscular contraction, and of the irritability of the muscular fibre; that the cerebrum is, on the contrary, the exhauster, through its acts of volition, of the muscular irritability.

As a further deduction from the same facts, we may infer the diagnosis between cerebral and spinal paralysis: mere cerebral paralysis is attended by augmented irritability, whereas spinal paralysis is that

which is attended by diminished irritability. This fact will prove useful in many obscure cases.

Having thus cleared up the physiological question, I proceed to the application of the principle to pathology; and I may here observe that there is a whole series of phenomena which admit of explanation by its aid.

And, first, the exception to the rule of augmented muscular irritability in paralytic limbs, is obviously dependent upon its existing in the cases of paralysis from the severed influence of the spinal marrow, as distinguished from those arising from the severed influence of the cerebrum merely.

Secondly, we understand at once why the influence of strychnine is first, and most, seen in cerebral paralysis, in the paralytic limbs.

But there are still some other points which I must bring before the notice of the Society.

The first of these is the influence of emotion in paralytic limbs.

The second is the similar influence of certain acts of respiration; as yawning, sneezing, coughing, &c.

The third, the similar influence of the tonic power.

It must have occurred to us all to observe the influence of surprise or agitation, on the arm and hand, and perhaps on the leg, of a patient long affected by hemiplegia, whilst the limbs of the healthy side remained unaffected. In this case the influence of the emotion is, like that of strychnine in the case formerly discussed, exerted equally upon

the limbs of both sides; but it is the muscles of the paralytic limbs which are most irritable, most susceptible of the stimulus; it is therefore these limbs which are most convulsively affected.

The same phenomenon is not observed in paraplegia, because the influence of the emotion is cut off from the affected limbs.

CASE I.

I was called to a patient a short period ago, affected at that moment with bronchitis. He was forty-three years of age; and at the age of twenty-four had been seized with hemiplegia. Recovering from the immediate danger of the attack, he remained hemiplegic, scarcely regaining the use of the hand and arm at all, and only partially that of the leg.

Whenever this patient is excited by meeting an acquaintance, or in any similar way, he has a little strabismus, and the hand and arm are contracted and convulsed in the most extraordinary manner: whenever he coughs, the leg is thrown involuntarily upwards. The arm is severed, as it were, from volition, but affected by emotion.

Similar facts have been observed in regard to the influence of certain respiratory acts, but especially those of yawning, sneezing, &c.

Dr. Abercrombie details the following interesting case in a note to the late Mr. Shaw:

"I think the following case will be interesting to

you and Mr. Bell. I had some time ago under my care, a man affected with hemiplegia of the left side; the palsy complete, without the least attempt at motion, except under the following circumstances: he was very much affected with yawning, and every time he yawned the paralytic arm was raised up, with a firm steady motion, until it was at right angles with his body (as he lay in bed on his back), the fore-arm a little bent inwards, so that his hand was above his forehead at its greatest elevation. The arm was raised steadily during the inspiration, and when the expiration began seemed to drop down by its own weight, with considerable force. He continued liable to the affection for a considerable time, and it ceased gradually as he began to recover the natural motion of the limb."—That is, as I conclude, as the state of augmented irritability was removed by the returning acts of volition.

Not less interesting are the effects of the tonic power. In cases of hemiplegia of long duration, the paralytic limbs, but especially the arms and hands, are drawn into a state of chronic, rigid, contraction. This phenomenon is owing to the principle of tone constantly acting upon muscles now possessing augmented irritability, whilst they are never, or rarely, relaxed by acts of volition.

A similar effect is seen in idiots born with atrophied cerebrum: the influence of volition is wanting; that of the spinal marrow, the source, at once, of the tone and of the irritability of the muscular system, is in constant action, and induces chronic

contraction, an effect which must, however, be distinguished from that of spasm, which is excited immediately by some disease of the spinal marrow itself.

I may now resume the subject of the action of strychnine on paralytic limbs. It is obvious that the generalization of M. Fouquier, M. Ségalas, and others, that the strychnine attacks the paralytic rather than the healthy limbs, was too hasty. This is only true in those cases of paralysis in which the muscles still remain in nervous connexion with the spinal marrow; the opposite result is observed in those other cases in which such connection between the muscles and the spinal marrow is intercepted.

I would here make another observation. The arms and hands, generally speaking, are more under the influence of the cerebrum than the lower extremities; and these, on the other hand, are more under the influence of the spinal marrow than the arms and hands. The superior extremities are more and more frequently affected by hemiplegia than the inferior; these are more influenced by tetanus, by strychnine, &c., than the former, a fact which I have observed, in regard to strychnine, in some cases of hemiplegia. These facts must be borne in mind in making our observations.

Another circumstance must also be noticed. The more perfect the paralysis, generally speaking, the more the irritability of the muscular fibre is augmented. In hemiplegia, the arm is generally at once more paralytic and more irritable than the leg.

In chronic cases, however, the irritability becomes impaired, together with the nutrition.

I will now adduce a few cases which, however succinctly detailed, will exemplify and substantiate the preceding observations.

CASE II.

On January the 16th, 1839, I visited a patient who had been seized with hemiplegia nine months before: the arm was perfectly paralytic, the leg less so, the face less so still. On passing the galvanic influence through the arms, the left or paralytic arm was much more affected than the right, and distinctly affected by a force which induced no effect whatever on the right, the tendons starting on each completion of the galvanic circle; the contraction of the muscles of the left side of the face was seen in its effect on the features; and that of the left gastrocnemius, in its effect on the tendo Achilles, when no effect was perceptible on the right side of the face, or in the right leg.

In this patient other and very interesting phenomena were observed:

1st. The arm has, from the beginning, been much more paralytic than the leg or the face:

2nd. The influence of strychnine was observed in the paralytic arm and leg only, in the latter more than in the former:

3rd. Any sudden noise, or other causes of emo-

tion, affect the paralytic side only—the leg, however, more than the arm:

4th. Yawning and sneezing move the paralytic limbs; the former the arm, the latter the leg, principally:

5th. The act of stretching, and the act of raising the right arm above the head, induce unconscious movements of the left or paralytic arm:

6th. During sleep, the left or paralytic arm and hand are greatly contracted and painfully pressed to the side:

7th. The paralytic arm shrinks from the application of cold, as the sudden contact of a cold hand; an example of the reflex action in hemiplegia:

8th. Lastly, the paralytic hand and arm are constantly in a state of contraction.

I repeated the trials with the galvanic shock, with the same results, on February the 14th.

CASE III.

On January the 15th and 22nd, 1839, I passed a slight galvanic shock through the orbicularis of each side of the face, in a patient affected with paralysis of the left facial nerve from exposure to cold, of six weeks' duration. Here the right eyelid was forcibly closed, the left or paralytic eyelid being totally unaffected.

CASE IV.

On February the 13th, I passed the galvanic shock through the two orbiculares in a patient whom I visited with Mr. Burford, and in whom the facial nerve was partially paralyzed by the removal of a considerable branch of the nerve, together with a tumour which had formed in its course along the cheek.

The muscle of the paralytic side was unaffected, whilst that of the healthy side closed the eyelids on every application of the galvanic influence.

CASE V.

I have more recently performed the same experiment on a patient affected with paralysis of the facial nerve, from otitis and disease of the temporal bone, with precisely the same result.

CASE VI.

On February the 9th, I compared the influence of the galvanic in two patients at the St. Pancras Infirmary: both were affected with complete muscular paralysis of the arm; the first case was cerebral, being hemiplegia; the second was an injury of the brachial plexus, having resulted from dislocation of the shoulder; the results were what I had anticipated; in the case of hemiplegia, the irritability of

the muscles of the paralytic limbs was greater than that of the muscles of the healthy limb; in the case of injured brachial plexus, the opposite state of things was observed, the irritability of the muscles of the paralytic hand and fore arm being greatly diminished.

CASE VII.

On January the 23rd, 1839, I passed the galvanic shock through the hands of a patient who had been gradually affected with paralysis of the right, from handling leaden types, as a compositor. Here, again, the paralytic muscles were unaffected by a degree of galvanism, which induced an evident effect on the muscles of the healthy limb.

CASES VIII. and IX.

On January the 10th, 1839, I galvanized a little boy with paralysis of the left leg; the muscles were more irritable than those of the healthy leg; the affection had followed pertussis, and I concluded that it was cerebral. This conclusion was confirmed by a fact which I learnt afterwards, viz. that in the commencement there was imperfect closure of the eyelids during sleep. On the same day I tried the galvanic influence in a case of partial paraplegia in a little girl, a patient of Mr. Burford; in this case the muscles of the paralytic limbs were less irritable than those of the healthy limbs; I concluded that

the disease was seated in the course of the nerves, and probably within the lumbar vertebræ.

CASE X.

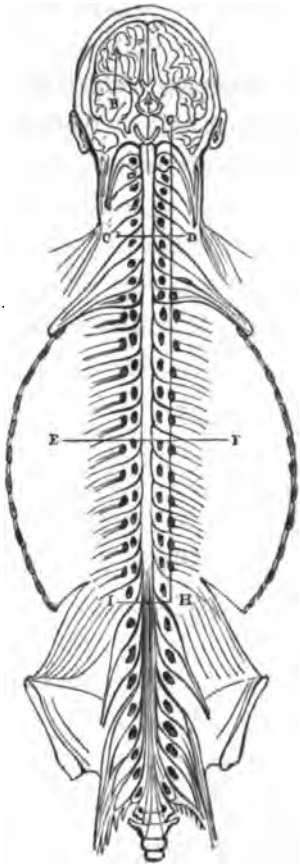
It has been suggested to me, that the loss of irritability in the cases of spinal paralysis might be owing to defective nutrition of the muscles. I therefore tried the effect of galvanism in a case of chronic cerebral paralysis, or hemiplegia, with much emaciation of the paralytic muscles. I found these muscles, as before, much more irritable than those of the unaffected limb.

I must repeat, that I am perfectly aware of the sketchy manner in which these notes of cases are given; but I thought it better to leave the further details for another kind of communication to this Society.

In the meantime we may conclude, that by the test afforded by the galvanic trough, we are enabled to effect a diagnosis between the cases to which I now allude. Disease of the cerebrum itself,—disease of the dorsal portion of the spinal marrow,—induces cerebral paralysis, hemiplegia, or paraplegia; disease compressing or destroying the facial nerve, or the cauda equina in the lumbar region, induces both cerebral and spinal paralysis. In the former case we shall observe augmented, in the latter diminished, irritability of the muscular fibre.

This conclusion is generalized in the sketch given opposite. In all cases of paralysis represented

by the lines A B, C D, E F, &c., the influence of the cerebrum is removed, that of the spinal marrow, the source of the excitor power in the nerves, and of the irritability of the muscular fibre, remaining; we have, therefore, augmented irritability. In all cases of paralysis represented by the lines G H, H I, the influence of the spinal marrow itself is removed; we have, therefore, diminished irritability. These lines



may be designated lines of cerebral, or of spinal, paralysis, respectively.

I may now resume the points of this paper, and observe,

1st. That the spinal marrow, exclusive of the cerebrum, is the source of the muscular irritability:

2nd. That the cerebrum is, in its acts of volition, an exhauster of that irritability:

3rd. That, in muscles separated from their nervous connexion with the brain, we have augmented irritability:

4th. That, in muscles separated from their nervous connexion with the spinal marrow, we have, on the contrary, diminished irritability:

5th. That the degree of the irritability of the muscular fibre of paralytic limbs, compared with that of the muscles of the healthy limbs, will afford us a source of diagnosis between cerebral and spinal paralysis, and especially between

1. Hemiplegia of the face, and
2. Paralysis of the facial nerve;

3. Hemiplegia of the arm or leg, and
4. Disease of the nerves of these limbs;*

5. Disease of the spinal marrow in the dorsal region, and
6. Disease of the cauda equina in the lumbar region; &c.

* In disease of the cervical vertebræ, the arms are sometimes paralyzed without paralysis of the legs; this probably arises from compression of the brachial plexus. See Sir B. Brodie's paper in

6th. That the greater influence of emotion, of certain respiratory acts, of the principle of tone, &c., on the muscles of certain paralytic limbs, than on those of healthy limbs, depends on their augmented irritability:

7th. That the same principle explains the greater susceptibility of the muscles in certain cases of paralytic limbs, to the influence of strychnine:

8th. That, in the conclusions of M. Fouquier, Professor Müller, &c., a sufficient distinction was not made between the influence of the cerebrum and of the spinal marrow, which in this, as in so many other respects, have such different properties:

9th. From these, and other experiments and observations, I conclude, too, that sleep restores the irritability of the muscular system, by arresting the acts of volition, which exhaust or diminish it; muscular efforts, on the other hand, diminish the irritability and induce fatigue.

I may again observe, in conclusion, that I have purposely avoided giving cases in detail. I wished, in this communication, to restrict myself to principles; in a future one, I may supply the defect to which I have alluded. On an early occasion, I propose to lay before the Society, in a second memoir, the results of my observations, 1st. On the reflex action in certain cases of paralysis, tetanus, &c.; and, 2nd. On the retrograde action in certain cases of disease of the spinal marrow.

the transactions of this Society, vol. xx. p. 130; the galvanic trough would determine the question.

A CASE

OF

ENLARGEMENT FROM MELANOID TUMOUR

OF THE

PROSTATE GLAND,

IN A CHILD OF FIVE YEARS OF AGE.

By R. A. STAFFORD,

SURGEON TO THE ST. MARYLEBONE INFIRMARY.

READ APRIL 9TH, 1839.

As I believe an enlargement of the prostate gland, and of its third lobe, in a child of 5 years of age, is of very rare occurrence, I have thought an account of a case where this disease was found on the post-mortem examination, might not be considered uninteresting by the Fellows of this Society.

November, 1838, I was requested to see W. Mathews, aged 5 years, in the Children's Ward of the St. Marylebone Infirmary, who had what was supposed to be a tumour in the abdomen. There

was a considerable projection, which reached full two inches above the umbilicus, and the edges of it could be distinctly defined by the fingers. On closely examining it, I found it to be a distended bladder, which had been in this state for some time. The boy felt no pain on pressure, nor could anything be found such as a diseased spine, causing paralysis of the bladder, &c., to account for his symptoms; neither could I elicit anything from him to throw light on the affection. All he complained of was, that he could not make water, and that he had tried several times and could not succeed. His mother, however, informed me afterwards, that for three or four months previously, she had observed his bladder was very irritable, and he was continually wishing to void urine, and that his abdomen was large and tumid. His health was not materially affected, excepting that he was thin, and not as lively as other children, but he could eat, drink, and sleep well.

At the period when I first saw him, he appeared to have suffered greatly from the retention of urine, being very restless and irritable, and having an anxious and distressed countenance. His pulse was quick, his tongue furred, and there was considerable fever. A small gum elastic catheter was passed, without difficulty, and 25 ounces of a natural coloured urine were drawn off. In the evening the bladder was again distended, and it contained nearly the same quantity.

The boy had entirely lost the power of voiding his urine naturally, so that the catheter was used twice

every day, and at length, from the urine accumulating so quickly, it was left in the bladder altogether. Leeches were applied on the perinæum, and a blister on the loins. Aperients, opiates, &c., were given as often as required, and the Tinctura ferri muriata administered. No abatement of the symptoms took place, and still there was no pain (excepting when it was distended,) in the bladder, on pressure, nor in the abdomen, nor any other symptom indicating disease of any particular organ. The boy became weak, so that it was necessary to support him. He took bark, wine, and nourishing food. The weakness increased, and in 8 days from the time I first saw him, he gradually sunk and died, his intellects being unimpaired to the last.

Post-mortem Examination.—The viscera of the thorax and abdomen were healthy.

The brain was healthy, excepting that there was a small quantity of fluid in the ventricles.

The kidneys were large and flabby, but there was nothing that could be considered disease.

The bladder was contracted to about the size of a turkey's egg, and on opening it, it contained about an ounce of urine mingled with purulent matter. The mucous membrane of the bladder was somewhat thickened; in other respects this organ was sound.

The prostate gland, according to a dissection made by Mr. Stanley, was equal in size to the largest walnut; its form was somewhat globular, as is often the case with the enlarged prostate in advanced life. There arose from the prostate into the bladder

immediately behind the orifice of the urethra, a rounded nipple-like projection, nearly equal in size to a small hazel-nut, and exactly resembling, both in its appearance and situation, the projection of the gland usually ascribed to an enlargement of its third lobe.

On making an incision through one lateral lobe of the prostate, the cut surface exhibited none of the natural texture of the gland; it was decidedly encephaloid in colour, consistence, and texture, and one part of the cut surface exhibited so dark a colour, as to present the idea of there being melanotic, mixed with the encephaloid matter.

It may be necessary to observe, that the prostate gland in a child of five years of age, is about the size of a small hazel-nut; consequently, its increase of volume, in this case, was immense, and even its third lobe alone was as large as the normal size of the whole gland itself at that period of life.

CASE

OF

CONGENITAL ABSENCE

OF THE

PERICARDIUM,

WITH

OBSERVATIONS.

By T. B. CURLING,

ASSISTANT SURGEON TO THE LONDON HOSPITAL, ETC.

READ APRIL 23RD, 1839.

The subject of this uncommon malformation was a gardener, aged forty-six, who was admitted into the London Hospital under the care of Dr. Gordon, January 28th, 1839. After exposure to wet he had been seized with symptoms of paralysis, which commenced in the lower extremities, and gradually extended upwards until, the muscles of respiration becoming affected, asphyxia ensued, and he died on the 18th of February. He had previously enjoyed a good state of health, but, before the age of puberty, had been subject to attacks of profuse epistaxis. No-

thing remarkable was observed in the action of the heart, or in the pulse.

I will not occupy time by a minute detail of the morbid appearances found in the inspection of the body after death, since they are not connected with the curious malformation which it is my object to submit to the notice of the Society, though some of them are unusual, and by no means devoid of interest. It is sufficient to mention, that they consisted of ramollissement of the central part of the whole medulla spinalis, deep injection of the mucous membrane of the bladder, and prostatic and membranous parts of the urethra, suppuration of Cowper's gland, and deposits of lymph in the substance of the testicles, with adhesions of the tunica vaginalis. On opening the cavity of the chest, by raising the sternum with the costal cartilages, I was much astonished at finding the heart completely exposed, lying loose in the cavity of the left pleura, in immediate contact with the lung, without any appearance whatever of pericardium. The heart was rather large and flabby, and in its natural position in the chest. On the anterior part of the left ventricle there was a small white opaque patch, and there was another of larger size on the posterior surface of the right ventricle. Nearly the whole front of the right ventricle was coated with a layer of fat. The vessels connected with the heart exhibited nothing remarkable, their relation being perfectly natural. On introducing the little finger into the aorta, its valves appeared to be healthy. The heart was a little overlapped by the

anterior edge of the inferior lobe of the left lung, to which it was connected by a slight adhesion about a quarter of an inch in length. The pleura covering that part of the left lung in contact with the heart, was opaque, white, and thickened. The pleura was easily traced from the left lung, along the large pulmonary vessels, to the heart, which it invested so as to form a reflected pericardium, thence passing over the pulmonary vessels on the right side, and the commencement of the aorta, it went forwards to join the pleura costalis, being at first in close relation to the right pleura, to which it was connected by loose cellular tissue, but afterwards separating to leave space for the anterior mediastinum. On the right side of the heart, just above the junction of the inferior vena cava, and close to the diaphragm, there was a pouch in the serous membrane, with a defined margin inferiorly, into which the appendix of the auricle projected. The left phrenic nerve crossed the trachea opposite the first bone of the sternum, and, passing to the front, and rather to the right side of the heart, proceeded to the diaphragm along the anterior mediastinum. The right phrenic nerve passed between the two layers of the separate pleuræ, about two inches behind the left. The lungs were healthy, with the exception of a little emphysema at the margins of the lower lobes. There was an old adhesion half an inch wide, connecting the outer part of the upper lobe of the left lung to the pleura costalis.

A deficiency of the pericardium is admitted to be

one of the most rare congenital deviations from normal structure to which the human body is liable, and there are very few well-authenticated cases of it on record. Haller* and Morgagni† have even denied that such a malformation ever existed, and they believed that the cases of absence of the membrane related by previous authors were merely instances of an intimate adhesion of the heart and pericardium. The incredulity of Haller on this point was strengthened by the discovery, on dissection, that certain animals, as the hedgehog and mole, which are represented by some of the old writers on comparative anatomy to be without a pericardium, are really not deficient in this membrane; and it is an interesting circumstance in connection with this malformation that, in all the inferior animals in which a perfect heart is found, this organ is always enclosed in a distinct sac or pericardium. The only genuine case of an absence of the pericardium met with in this country, which is on record, is described by Dr. Baillie.‡ It occurred to him, upon opening the cavity of the chest in a man about forty years of age, in order to explain at lecture the situation of the thoracic viscera, when he was exceedingly surprised to see the naked heart lying on the left side of the chest. The anatomical particulars of Dr. Baillie's case correspond very nearly with those in the exam-

* Elementa Physiologiæ, vol. i., lib. iv., sect. 1, p. 289.

† Epist. xxiii., Nos. 17 and 18.

‡ Trans. of a Society for the Improvement of Medical and Chirurgical Knowledge, vol. i., p. 91.

ple furnished in this communication, the imperfection being equally complete. Breschet has also recorded another undoubted case of this malformation.* A young man twenty-eight years of age, of habitual good health, and free from any disorder of the respiratory and circulating functions, was admitted into the Hotel Dieu of Paris, December 5th, 1825, on account of acute dysentery, of which he died in three days. On a careful inspection of the body, besides the morbid appearances in the mucous membrane of the intestines, it was found that there was no pericardium, the heart being contained in the left cavity of the chest. The heart was retained in its situation by two bridles two inches in length, which proceeded from the left side of its apex to the diaphragm, to which they were attached. In Dr. Baillie's case there was no trace whatever of the pericardium; but in the example described by Breschet there were distinct vestiges of the existence of this membrane, consisting of a shallow depression or capsule on the left side of the mediastinum, close to the diaphragm, and a cylindrical fibrous filament, crossing the base of the heart without adhering to it. The capsule alluded to by Breschet was evidently very similar to the pouch which I met with close to the right auricle in the present case, but this was the only rudiment of a pericardium that I could detect. In all these cases the heart was invested with a serous membrane, continuous with the left pleura, which formed a perfect reflected pericardium, and, alike in

* Répertoire Général d'Anatomie, t. i., p. 67.

all three, the left phrenic nerve deviated from its usual course, passing nearer the mesial line of the body. This alteration in the course of the left phrenic nerve, and the absence of a close union between the heart and diaphragm, will always be sufficient to distinguish congenital deficiency of the pericardium from universal adhesion of that membrane to the heart.

The following cases, although the anatomical details are imperfectly given, must also be viewed as instances of this malformation.

Dr. Woolf* relates that a woman, aged forty-two, died of typhus fever at a late period of pregnancy. Spontaneous delivery took place after death. On examination of the body the day after her decease, it was found a good deal distended with gas, which appeared to have caused extroversion of the uterus, and the birth of the child. There was a complete absence of the pericardium, the heart being free on the left side of the thorax, and in its usual position. The heart was very large, but not at all loaded with adipose tissue, although the rest of the body was extremely fat. It was of a yellowish-brown red colour, and easily broken down with the fingers. The auricles were of great size, thin, and of soft texture. No trace of the pericardium could be discovered about the great vessels. The outer membrane of the heart was present, but it was rather thinner, and more lax in texture than usual. The

* Rust's Magazin für die gesammte Heilkunde, vol. xxiii., p. 333.

husband stated that the deceased had enjoyed good health; but when under the influence of mental emotion, or suffering from severe bodily exertion, she had complained of constriction and oppression at the chest, and violent palpitations of the heart.

A preparation exhibiting a deficiency of the pericardium, taken from a man twenty years of age, is described by Walter in his Museum Anatomicum. The heart was observed lying naked in the same cavity with the left lung, the pericardium being entirely wanting.*

M. Littre, on examining the body of a woman fifty-four years of age, found the heart without any pericardium, and included absolutely naked in the cavity of the chest. The heart was hard, dry, unequal, and rough, and had little fat.†

The case noticed by Realdus Columbus, of a young student at Rome who died in a state of syncope, and whose heart was devoid of a pericardium;‡ that related by Tulpius, of a young man subject to violent palpitations of the heart, fainting fits, and an intermittent pulse, whose heart was found after death very large, and without a pericardium;§ and the case mentioned by Bartholinus;‖ cannot be received as genuine instances of this malformation.

The anomaly presented by a heart which had duly

* No. 668.

† Histoire de l'Acad. Roy. des Sciences, 1712, p. 37.

‡ De Re Anat. lib. xv., p. 265.

§ Obs. Med., lib. ii., chap. xxv., p. 134.

‖ Hist. Anat., Cent. iv., No. 20.

performed its work for forty years without a pericardium, induced Dr. Baillie to speculate on the uses of this membrane, which he was inclined to think are not very important. He remarks, that "the more striking use of a pericardium is to keep the heart in a steady situation, so as to enable it to carry on its functions uniformly."* He omits however to notice one material advantage gained by the heart being enclosed in a serous bag separate from that of the lung, which is, a greater exemption from the effects of inflammation. Thus there is no morbid lesion more often recognised after death than pleuritic adhesions, and there are few diseases of more common occurrence than inflammation of the pleura. Now had the heart been always contained in a common sac with the lung, its serous investment must necessarily have often shared in the inflammation so frequently affecting the pleura, and thus an organ, the motions of which should always be free and unrestrained, would be very liable to be interfered with by changes, which, though of little consequence in regard to the lungs, almost invariably lead to serious disease of the heart. The slight adhesion between this organ and the lung, which existed in the case that I have related, could scarcely have caused any interruption to the actions of the heart. In Breschet's case there were two slender adhesions between the heart and diaphragm, which must have in some degree confined its movements.

* Lib. cit., p. 100.

Dr. Hodgkin* thinks it probable that the opaque white patches so frequently seen on the anterior surface of the heart are the effect of attrition. The appearance noticed in this case of a similar change in the pleura, investing only that part of the lung which is exposed to friction in the actions of the heart, tends to support this opinion.

March 1st, 1839.

* Lectures on the Morbid Anatomy of the Serous Membranes, p. 98.

ON

A PECULIAR FORM

OF

CONGENITAL TUMOUR

OF

THE NECK.

By CÆSAR HAWKINS, Esq.

SURGEON TO SAINT GEORGE'S HOSPITAL.

READ MAY 28TH, 1839.

A VARIETY of tumours are met with in new-born infants, which are liable to immediate or future increase, having, for the most part, a single cyst, with various contents.

In some of these cysts there are portions of organized material, scalp, or cranial bone, or jaw bone, or nearly an entire fœtus, which can scarcely be supposed to arise from any cause other than an imperfect development and junction of two embryos in utero.

In a second class of congenital encysted tumour are some peculiar secretions,—stearine, or fatty matter, generally mixed with hair, too deeply situated to

arise from the follicles in the skin,—shining particles, called by Chevreuil and Dr. Prout margaritic acid; —or pulpy matter, like rotten medlar or apple, and other materials, which, although occasionally seen also in after life, are most frequently found about the time of birth.

A third class of cysts are occasionally met with in infants, but not so frequently as at a later period of life;—serous encysted tumours in any cellular texture; sebaceous encysted tumours in the cutaneous structure; or mucous encysted tumours, formed in the same manner as the last, but in the follicles of the mucous texture, or in the excretory ducts of glands.

I have mentioned these different kinds of encysted tumours, which may be met with in infants, in order carefully to exclude them from consideration; the object of the present paper being, not to speak of any single cyst, but of a peculiar form of congenital tumour, which is composed of many cysts joined together, in which the proportion of organized matter is so considerable, as to give a more solid character to the tumour, and make it deserve the name of cystic tumour, as much as the apparently analogous cases of cystic sarcoma, occasionally found in the breast, testis, or ovary of adults.

I have met with seven such tumours in the necks of young children, where a correct diagnosis is so important; and as the feeling and appearance of the tumour are somewhat obscure, I am led to hope that the following account may not be useless, and the

two following cases may serve to show the common forms in which the tumour presents itself,—one being of large size, the other small.

A child, about eight months old, was brought to me from Mr. Julius, of Richmond, having a large tumour on the right side of the neck, which was of the size of a small orange at its birth, and had gradually increased since that time. The tumour now reached from the zygoma to the coicoid cartilage, and from the mastoid process to the chin; it pojected outwards about three inches, so as to make the side of the face and neck appear nearly twice as large as the opposite side; and it extended also below the jaw, into the mouth, so as to push the tongue considerably to the opposite side and upwards. But although it caused much unsightliness, it appeared to occasion no pain nor inconvenience, and the child was quite healthy.

The skin was unaltered, and unattached to the tumour, and had much fat below it, and the outline of the tumour was smooth and uniform to the eye; on feeling it carefully, however, it was evident that there were several globular irregularities, some of which were-of hard consistence, as if solid, and possibly glandular, but four others in the parotid and submaxillary glands appeared to contain fluid, which was the more probable, as two other cysts were perceptible below the tongue, transparent, like ranulæ, but containing a dark red fluid.

The cysts were punctured from time to time, as they refilled, and the same plan was pursued with

several other cysts, which came forward as those first observed were obliterated; each cyst contained from a drachm to half an ounce of liquid, the contents of some being nearly clear water, with very little trace of mucus or albumen, but the secretion of others being of a darker colour, with more coagulable matter, so as to resemble melted currant jelly. Friction was also employed, with hydriodate of potash ointment in the intervals of the punctures.

This treatment was continued for about a year, when the disposition to secrete fluid appeared to be subdued, and the swelling was about a third of its original size, and what remained felt and looked like a loose pendulous bag of fat and skin, with two or three solid lumps, like glands, below. I have lost sight of the child from that time, but on applying recently to Mr. Julius, who continued to see it, he has been kind enough to inform me, that the child has been removed from Richmond for several years, but that when he last saw it, there was no tumour remaining.

The appearance of the tumour in this case was more complicated than in the next which I will mention, which Mr. Palmer attended, at the St. George's and St. James's Dispensary, and which he requested me to look at. The tumour was, in this instance, about the size of an orange, and was soft and elastic, moveable, and nearly pendulous, from its weight, and was situated in the same place as in the last case, in front of the ear, and below the jaw. It gave no

pain nor inconvenience, and had scarcely increased in size since the birth of the child, who was now about a year old. The skin, as in the other case, was unattached, and had much fat below it, and there had been, I believe, some thoughts of removing the disease as a common adipose tumour. There were in it, however, several round bodies, two of which appeared to contain fluid, but the nature of the others was more doubtful. One of these, at the margin of the parotid gland, contained three drachms of clear liquid, but the other being punctured, no fluid escaped through the needle. With the final result of the case, I am not acquainted, as the child was not brought many times to the Dispensary.

The other cases were intermediate, in many respects, between these two; one of which, it appears from this account, contained altogether about a dozen cysts, large enough to be punctured, while only one or two such were present in the other tumour; in one, the cysts presented in the mouth, as well as externally, (of which I have seen one other instance,) while in the other, the tumour was solely on the external part of the neck; one increased steadily, the other scarcely altered from the time of birth; in one the cysts were easily distinguished, while in the other the projecting bodies felt more solid; in consequence, as dissection shows, of the cysts being very small and closely set together.

I was inclined to think, from the situation which the tumours occupied in the first two cases that fell

under my notice, that the cysts might arise from obstruction of some of the ducts of the parotid and submaxillary glands; but I have seen a congenital tumour, composed of several cysts of serum, occupying the whole axilla, and projecting in the neck and below the arm, and raising the pectoral muscles in the intermediate space; and in a case of apparently the same nature, described by Mr. Arnott, in the Medical Gazette of March 16th, 1839, the cystic tumour was equally remote from the salivary glands, being in the posterior part of the neck, behind the sterno mastoid muscle. The following fatal case appears to me to demonstrate the nature of the other cases, especially when considered with Mr. Arnott's, the operation for which I shall presently allude to.

A child, eleven weeks old, was sent to me at St. George's Hospital, by Dr. Willis, with a tumour in the neck: it was emaciated to the last degree, and actually smaller, according to the mother's account, than when it was born; as, in fact, it had scarcely digested any food from its birth, almost every thing that was swallowed, or attempted to be swallowed, being nearly directly vomited again: it had also scarcely slept since its birth, as, whenever laid down in the horizontal position, it was instantly roused from slumber by impending suffocation; whatever rest it did obtain was therefore procured while held nearly upright in the arms. Notwithstanding this however, it did not cry or breathe, when awake, as if there was any constant pressure about the glottis,

nor was the tumour in the neck so tense as to account for the symptoms, unless some portion was intricately connected with the larynx and œsophagus, independently of the general tenseness of the whole tumour; which did not appear very probable, from the facility with which respiration was ordinarily performed. On the right side of the neck was a tumour, the prominent part of which was of the size of a large orange, and which reached from the zygoma nearly to the clavicle, and from the ear to the chin, across the upper part. It was soft and elastic, and the skin was healthy and unattached, and it seemed to be quite free from pain or tenderness.

Below the jaw I could detect three or four small cysts of fluid, and one or two smaller, and apparently solid bodies, like glands; but the greater part of the tumour in front of the ear did not fluctuate, nor present any irregularity of surface, but was soft and elastic, and compressible, like a subcutaneous nævus, which disease it resembled, also, in becoming more tense and prominent from crying or struggling, and below the mucous membrane of the mouth were several varicose vessels, like those observed sometimes in the neighbourhood of blood-vessel tumours. The child appeared to be too far reduced for any treatment, and died a few days afterwards, suffocated suddenly after having apparently suffered a good deal of pain for a day or two; and I obtained permission to examine the body, for which purpose Mr. Hewett was kind enough to accompany me.

When the thin skin covering the tumour was turned back, it appeared to be of the size of two oranges, separated by a deep sulcus, which was formed by the tendon of the digastricus muscle, which being much pushed forwards by the tumour, must have had its actions in connection with the larynx and pharynx much interfered with. The disease was now seen to be composed of a great number of small cysts, many hundreds probably, varying in size from a pea to a walnut, closely joined together, and composed of delicate membranes, like very fine peritoneum, but in some parts covered by fibrous structure, giving the cysts the appearance of thin pericardium, and very few of them were so far insulated as to admit of being dissected out without cutting through others. The fluid in most of the cysts was transparent, with scarcely any trace of coagulable matter, but in others the contents were of every shade of red, even as dark as venous blood, but without any coagulum, and evidently only coloured secretion.

The softness and elasticity of the prominent part of the tumour, arose from most of the cysts in that situation being flaccid, and only half filled; in other parts single cysts were so tense as to be quite unyielding, as if solid, and a feeling of solidity was also given by a few cysts being more closely joined together than those by their side; and in one or two parts a tense cyst projected into another in a flaccid state, so as also to feel like a solid body; although the only really solid bodies were two or three small

absorbent glands, mixed with the cysts. The portion of the tumour in front of the ear was covered by a thin layer of condensed parotid gland, another part of which, in a healthy state, lay behind the cysts, through the middle of which ran the portio dura, and external carotid artery. The submaxillary gland was pushed out by other cysts, so as to be loose below the skin, and all the vessels and nerves at the base of the jaw were surrounded by some of the cysts, and curiously twisted in their course.

On dissecting deeper, the cysts were found to extend along the front of the spine, behind the pharynx and œsophagus, some being as high as the basilar process, and some as low as the sixth cervical vertebra; and along the whole length of the neck the cysts surrounded the carotid artery, jugular vein, and nervus vagus, which were even separated from one another by some cysts formed in their sheath. None of these bodies were very closely united to the œsophagus and pharynx, and there seemed to be nothing morbid about the glottis, except a slight thickening of the mucous membrane.

It is evident from this account, that the numerous cysts which compose the tumour are formed in the common cellular tissue; each separate cyst, it is to be presumed, being like the single serous encysted tumour met with in many parts of the body, at every age; why such numbers should be formed at once before birth, does not appear, unless it arise from the peculiarly lax and watery nature of the cellular

membrane in the fœtus, especially, perhaps, in the neck, where I believe such a tumour to be more common than elsewhere.

The number of cysts existing in the tumour, and the different degrees of consistence of the whole or of separate parts in different cases, arising, as the dissection demonstrates, from the size and state of tension, and relative position of individual cysts, make the diagnosis of the tumour somewhat obscure. When numerous, and full of liquid, and small in size, they feel like enlarged glands, or other solid globular bodies; when numerous and only half filled, they become soft and compressible; but in both these cases the existence of fluid is difficult to be detected, in comparison with those cases in which only a few larger cysts exist.

The resemblance to fatty tumours is considerable, and the deception is assisted by the quantity of fat generally situated beneath the skin, and filling up the inequalities of the surface of the tumour. They are also much like a subcutaneous nævus, which is so often developed in the same situation, when the cysts are half-filled; in the fatal case I have related, the softness and compressibility of part of the tumour, its increase from exertion, and the varicose vessels within the cheek and mouth, made me think it probable that some part of the tumour was composed of blood-vessels, though the nature of the remainder was clearly perceptible. In each case that I have seen, however, the existence of globular bodies in some of which fluid was perceptible, distinguished

the tumour from every other kind likely to be formed in infancy.

In the treatment of these complicated cystic tumours, the mobility and apparent insulation of portions of the tumour, whether the projecting part be taken for a single cyst or for solid matter, leads to the idea of an easy dissection of the tumour from its connexions; while the real nature of the disease shows how totally impracticable an operation of this kind would be found, in many cases, from the inaccessible situation and intricate connexion of the deeper parts, with important blood-vessels and nerves passing in every direction betweeen the cysts.

In the case of Mr. Arnott's to which I have alluded, the tumour was situated in a somewhat less important situation behind the sterno-mastoid muscle. A single cyst was opened first, when the infant was a month old, and repeated once more, and when five months old, this was laid open, in order to remove what appeared to be a solid body, but which was found to be composed of a multitude of small cysts, as in the cases previously narrated. The tumour was followed under the sterno-mastoid muscle and carotid artery, and behind the pharynx, and its total excision being found impossible, a ligature was tied round the deeper part. The child ultimately did well, but the ligature was not entirely thrown off for three months, during which time repeated attacks of erysipelas occurred.

The history of this case is not, therefore, an en-

couragement for the performance of excision, in the more important parts about the angle of the jaw; at the same time, the occurrence of a fatal case would justify severe measures, if others fail, and shows the necessity for early attention to the tumour.

With regard to other treatment, I have only presented one completely successful case to the Society; but the progress made in the rest by similar means, when I lost sight of the children, leads me to believe that they also would have been cured. This treatment was on the same principles that are often successful in the analogous serous encysted tumours, composed of one cyst instead of many; and also in the tumours formed by obstruction of the ducts of glands, as in the mammæ or salivary glands, or in the mucous follicles, as in the vagina or mouth.

1. The cysts may be emptied, from time to time, by a grooved needle, so that there is no scar whatever; or by a lancet, when they are situated in the mouth; the punctures heal directly, and the emptying the larger cysts appears to assist the action of other remedies upon the cysts themselves.

2. Pressure may be employed, especially after the evacuation of the fluid, in some situations, as in front of the ear, although, of course, this means is generally inapplicable, on account of its obvious interference with respiration, mastication, and deglutition.

3. Stimulant applications may be constantly employed, of such a strength as to excite moderate inflammation, but stopping short of suppuration, in order

to avoid deformity; for which reason, also, I directed their intermission for a short time after the punctures. The cysts do not appear, however, much disposed to inflammation, beyond the degree necessary for their obliteration and absorption, after the fluid has been got rid of. The applications I have made use of have been the ointment of hydriodate of potassa, rubbed on by the hand; a solution of a drachm of iodine and two scruples of hydriodate of potassa in an ounce of water, painted over the tumour by means of a camel's hair brush; a lotion, of half an ounce of Goulard with two ounces of spirit, and six of camphor mixture, applied by means of folded linen; or one composed of from one to two drachms of muriate of ammonia, mixed with two ounces of vinegar and spirits of wine, with eight or ten of water. I presume, however, that anything else would answer the same purpose, which did not excoriate or blister the skin, or excite suppuration in the cysts; and judging from the few cases I have seen, their effect would appear to extend to some depth below the skin, and to act on both the cysts and their fluid contents.

If a cure is effected by such means, before having recourse to the severer methods of laying open the cysts, or attempting their removal, it must obviously be tedious, as some cysts fill again more than once, and others come forward; hence, chiefly, the reason why several cases were only half cured, when I saw them last, the patience of the children's friends becoming exhausted before the cases could positively

be said to have been cured. The note I have quoted from Mr. Julius shows, however, that one large and extensive and deeply situated tumour, containing numerous cysts, could be completely got rid of by such means, and each of the others was very materially lessened, and would probably, I think, have been also cured by perseverance, if, indeed, the discontinuance of attendance did not arise from the absorption of the tumour going on, beyond what I myself saw.

CASES

OF

MEASLES,

OCCURRING OFTENER THAN ONCE IN THE SAME INDIVIDUALS.

By JOHN WEBSTER, M.D.,

CONSULTING PHYSICIAN TO ST. GEORGE AND ST. JAMES'S DISPENSARY.

READ MAY 28TH, 1839.

Measles, like small-pox, hooping-cough, and scarlatina, being usually considered a disease by which a person is liable to be affected only once in the course of life, it is consequently believed by some medical practitioners, that an individual, who has already passed through a regular attack of measles, is thereby protected from ever having any return of a similar complaint.

To such an opinion, although correct in the great majority of cases, we nevertheless find several exceptions recorded in authors, whereby it appears that this eruptive disease may occasionally attack the same patient a second time, notwithstanding its previous occurrence; and, as a well-marked instance of

the kind has recently come under my care, in addition to another and a still more rare example, which occurred two years ago, I think it may be interesting to detail them both, since the symptoms in each were most distinct, and strongly confirmative of the particular point just mentioned.

In order therefore to add to the evidence already possessed on the subject, I subjoin a short history of the two instances alluded to; especially, as in one of them, the disease appeared, not only a second, but even a third time, in the same patient; the symptoms being so unequivocally marked in every attack, that no doubt whatever was entertained, in either case, regarding the nature of the eruption, or the accompanying fever, which throughout exhibited all the ordinary characters of measles.

Having attended the patient whose case is first mentioned in the following pages, on both occasions when this eruptive disease supervened, it thus remains free from any doubt, which might perhaps have existed had the report of its previous appearance been only obtained at second hand; but seeing there is no break in the chain of evidence, the proof becomes quite conclusive; and although, in the second instance, the facts may not be so directly authenticated as in the former, they are nevertheless equally decisive, so that both cases seem of sufficient interest to be read in the Royal Medical and Chirurgical Society, where communications tending to the advancement of medical and surgical science, are always favourably received by the Fellows of this

learned Association; and, if worthy of publication, recorded in their Transactions.

CASE I.

Master F. H., in the early part of 1837, being then two years old, had a regular attack of measles, along with his elder brother and a cousin, all then living in the same house. I attended him throughout the disease, which exhibited the usual and unequivocal symptoms of that complaint: the eruption was well marked, copious, and continued apparent on the skin for the ordinary period; whilst the affection of the eyes, of the air passages, the cough, and the violence, as well as the duration of the febrile symptoms, placed the nature of his malady beyond any doubt; from which however, in due time, my patient recovered completely, by ordinary antiphlogistic treatment.

On the 23rd of March last, that is, about two years after the first attack of measles, Master F. H. became restless and slightly feverish; but it was only two days afterwards, or the 25th, when an eruption having appeared on his neck and face, the exact character of this patient's complaint remained no longer doubtful. He now had considerable fever, with quickness of pulse, along with the commonly remarked catarrhal symptoms, such as discharge from the nose, watery eyes, and slight cough; he complained likewise of thirst, and he had a foul tongue. On the 26th the eruption continued copious on the arms, legs, and body, at the same

time appearing in clusters, slightly elevated, and quite characteristic of its nature; the face, also, was now a little swelled, whilst the catarrhal affection remained; and had any uncertainty yet existed, regarding the nature of this eruptive disease, it would have been entirely removed from the mind of the most sceptical observer by examining a case exhibiting, as this one did, so many well-marked symptoms. The eruption, on the 27th, became less evident; and, by the evening of the 28th, it had almost disappeared, the patient being otherwise much better. On the 29th, Master F. H. was nearly convalescent; and, by the 31st of March, he got quite well.

The object proposed, in this communication, being to narrate only such circumstances as would fully establish the fact that measles had occurred a second time in the same person, it appears to be superfluous to particularize the remedies employed in the cure of so well known a disease. I may, however, briefly state, that the treatment pursued consisted almost wholly in active purging, diluents, and the strictest antiphlogistic regimen; which proved, as in the former attack, successful, the patient having been in due time restored to health by its adoption.

CASE II.

In the spring of 1837 I attended Miss S——, aged fifteen, who then had measles, according to report, for the third time, and which then assumed

rather a severe form; other members of the family being likewise affected with the same complaint. During this attack, the eruption was very copious, appearing all over the body, and clearly indicated its specific character; the other symptoms being equally well marked and decisive as to the nature of the disease: whilst the cough, and affection of the chest, were so violent as to require the application of leeches; and I may add, that a more severe or unequivocal instance of measles, than the case thus briefly mentioned, has seldom come under my observation, or which passed so regularly through every stage of that well known complaint. However, in due time, the patient recovered; the treatment adopted being of the same antiphlogistic character which was followed in the previous case: such indeed as, according to my experience, ought generally to be pursued in this acute and often inflammatory complaint.

The parents of this young lady stated, in answer to inquiries made purposely, that she had already, on two occasions, passed through the measles in a perfect and regular form: first, at Madras, in 1826, when four years old; secondly, at Blois, in 1832, or about six years afterwards; whilst the third attack of this disease occurred after an interval again of nearly six years; when, as already stated, Miss S—— came under my care.

In the two previous attacks of measles, neither of the physicians in attendance expressed any doubt regarding the nature of the eruptive disease affecting

their patient; and both the parents, besides the governess, who however, it should be stated, only saw Miss S—— at Blois and in London, concurred in opinion that the eruption and other symptoms were so characteristic and similar in their appearance, as to remove from their minds all uncertainty in respect of identity with the previous attack. To my mind, also, the proofs adduced were quite conclusive on the subject; and they amply confirm the views entertained by those authors who, along with myself, consider that measles, although a disease likely to affect an individual only once in the course of life, it may nevertheless recur a second or even a third time in the same person; and on each occasion exhibit all the ordinary pathognomic symptoms, as distinctly as they appeared in the two examples I have now recorded.

Since the preceding paper was read to the Society, my friend, Dr. Forbes, of Argyle Street, having mentioned, in conversation, that he had met with a case similar to those now briefly detailed, I would beg leave to transcribe the note which he kindly wrote at my request; more especially, as the valuable evidence thus collaterally supplied by Dr. Forbes, amply confirms the particular point I have endeavoured to substantiate in that communication. It is dated June 1st, 1839.

"About four years ago I was sent for to visit Lord ——, aged ten, at Eton, whom I found suffering from measles. The attack was slight, but distinctly marked, as well by the character of the

eruption, as by the concomitant catarrhal symptoms.

"The elder brother, who was residing in the same house, escaped the infection. Lord —— had parted from his parents, only a few days before, on their leaving London for Paris, with their two daughters. I wrote to inform the mother of the occurrence, with my opinion, that the infection had been received in London, as the measles were not known to prevail at that time in Eton.

"The mother replied, in answer to my letter, that she was of the same opinion, since she was attacked with measles on her arrival at Calais; and the oldest daughter, also, on her arrival at Paris. The younger sister did not receive the infection.

"Upwards of four years afterwards, that is, within the last fortnight, I was desired to visit the same boy, in consequence of an eruption on the skin, which had appeared, first on the forehead, and gradually extended itself over the body and the extremities.

"The eruption on the face was copious; the catarrhal symptoms severe; the eyelids swollen; the eyes suffused, and morbidly sensible to light; with a copious secretion from the nose, hoarseness, and a dry cough: the eruption has declined, having left a slight discolouration of the skin."

In a postscript of the 5th June, Dr. Forbes adds, "I have just been informed that five boys, in the same house in which Lord —— was confined with

the measles, are now laid up with the same complaint."

After these conclusive examples, so fully supporting the opinion that measles may supervene a second or even a third time in the same individual, it appears almost superfluous to bring forward any additional proofs on that point; but if the present paper should obtain a place in the Society's Transactions, the facts it contains will both speak for themselves, and be appreciated, I hope, as they may deserve.

REMARKABLE CASE

OF

DRY GANGRENE,

OCCURRING IN A CHILD THREE YEARS AND SEVEN MONTHS OLD.

By SAMUEL SOLLY, F.R.S.,

LECTURER ON ANATOMY AND PHYSIOLOGY, AND LECTURER ON COMPARATIVE ANATOMY, AT ST. THOMAS'S HOSPITAL.

READ MAY 28TH, 1839.

I HAVE ventured to bring the following extraordinary case before the notice of the Society, thinking that every pathological fact which can tend, even in the remotest degree, to elucidate the peculiar and special influence which the blood exerts when circulating through the capillaries of each various tissue of the body, is of the deepest interest to the medical practitioner. Have we not all reflected on the extraordinary fact, that the same fluid should produce such different effects in different organs? Are we not justified in regarding the attempts which the vessels of a sphacelated limb make to arrest the destructive course of the disease, and save the life of the rest of the organism, at the expense of only a small portion

of it, as a proof that there are other forces connected with the vascular system, in addition to those by which the nutritive particles are separated from the blood and deposited in the organism? Again, is it not indeed wonderful that immaterial mental phenomena should be as dependent for their development on the presence of arterial blood in the brain, as the continuation of the vitality of the organism of the limbs on the due and normal state of their circulation? This direct and indisputable relation between the intellectual faculties, and the presence of arterial blood in the capillaries of the brain, has induced me to observe and consider carefully every pathological or physiological fact which seemed capable of throwing any light on the real nature of the connection existing between the proper function of each individual organ, and the circulation of blood through its vessels.

For although isolated facts regarding the pathology of the circulation, of themselves, prove nothing, it will only be by generalizing with philosophic caution on a multitude of facts thus accumulated, and comparing them with those yielded by comparative anatomy, that these important problems can be solved.

But I must not be tempted, on the present occasion, to enlarge further on this deeply interesting subject.

For a knowledge of the following case I was indebted to my friend, Mr. Bury, of Farnham, under whose notice it came accidentally, and by whom its deep physiological importance was most fully appreciated.

The patient had been under the care of Mr. Bayley, of Odiham, to whom I am indebted for some particulars regarding its condition previous to my first visit.

On the 29th January 1839 I visited, in company with Mr. Bury, William Chandler, aged three years and seven months, then living with his parents at Crookham, near Farnham, in Surrey.

His father is a bargeman, earning about a pound a-week. His mother was a healthy-looking woman, but delicate; she has had four children, the eldest seven years old, perfectly well; the second died at two months; the third, William Chandler, is the subject of the case; the youngest was weakly, and since dead. The general food of the family has been bread and potatoes, with meat two or three times a-week. William Chandler was described to me as having been weakly from birth, but free from any evident disease, and that he ran alone at about two years old.

When I first saw him he was asleep in a cradle before the fire, and I was much struck with the placid expression of his countenance, the plumpness of his cheeks, which, though without colour, did not look unhealthy.

But no words can pourtray the extraordinary spectacle which he exhibited when his mother removed the bandages from his mutilated limbs.* His cheeks became rather purple from the excitement to

* The state of the child at this visit is represented by Plate III. fig. 1.

the circulation occasioned by his wakening, and a dark spot of a livid colour became apparent on his nose, which I was informed was the scar of a former slough, but it appeared the precursor of a second gangrenous spot. His right fore-arm was gone, having been partially amputated by nature at the elbow-joint by the disarticulation of the radius, though the ulna had been divided lower down, opposite a point which might be seen in the detached radius, as at that place the bone was thinner, a portion of its surface having been removed by absorption, where the line of separation had first commenced. The slough had extended above the elbow-joint, where nature appeared to be making a second attempt at amputation, from the distinct though comparatively pale line of ulceration between the living and dead portions of the limb.

The whole of the left fore arm, and about half the upper arm, was in a state of dry gangrene; but there was a distinct line of separation in the upper arm.

The foot of the left leg was completely removed just above the ankle-joint, between the epiphysis and the shaft of the tibia and fibula, leaving the extremities of the bone exposed, the soft parts presenting a surface healthy and granulating in one part, but sloughy in another.

On the right foot the phalanges of the second and third toes had been removed by the same unsparing hand, the stumps having a healthy cicatrix; but on the calf and knee of the leg there were livid spots.

Such was the extraordinary appearance of this poor little child the first time I saw it. The pulse in the carotids was 140, feeble, easily arrested, but distinct to the eye.

The action of the heart more feeble than natural, but unaccompanied by any unnatural or irregular sound. The mother observed that, when every thing was quiet, at night, it sounded as loud as the ticking of a watch.

The intellects were perfect, and the child, on the whole, wonderfully quiet and tranquil, but complains much of feeling cold unless close to the fire. From the mother's account I learned that the disease commenced at the latter end of last August, both his feet becoming of a blackish purple colour; that hot flannels relieved them only for a short time; sloughs, called by the woman *set-fasts*, began about the beginning of September, on the right leg first, above the heel. These sloughs separated. The sore healed in about a month; that on the left leg never healing, but gradually extending over the foot, and a line of demarcation was ultimately set up. Amputation gradually took place, and the limb was entirely removed by December the 30th.

The disease commenced in the left upper arm, about the middle of November, on the dorsal surface of the wrist. It followed on the right about a fortnight afterwards, commencing below the elbow, and the ulna was divided on the 18th of January; but nature, apparently not being able to effect the amputation perfectly in that spot, recommenced

above it. And the radius, together with the hand, was separated at the elbow joint on the 26th January. I could not ascertain the date of the amputation of the two toes on the right foot.

The following account, which I have since received from Mr. Bayley, under whose care, as parish surgeon, the child was placed, I give in his own words: "I believe it was about the beginning of September last when our little patient was first brought to me, with large vesicles on the right foot and fore arm, containing a dark livid-coloured fluid. These had not been preceded by pain, or any inflammatory appearances of the hand. The countenance was pale, the lips blanched, the pulse exceedingly quick and feeble; indeed, it gave more the sensation of fluttering than of pulsating. The abdomen seemed large; but the bowels were acting well, and the evacuations perfectly healthy.

"From a supposition that the disease was the consequence of debility of the heart's action, I ordered the parts to be fomented with warm cloths; the diet to be nutritive, with an allowance of port wine, brandy, &c., &c., in arrow-root and sago, and prescribed three powders, to be taken daily, each containing: Quin. Disulph. gr. ss. Pulv. Zingiberis gr. j; but, from inattention of the mother, no medicines were given regularly.

"About ten days after this I again saw the child; and found that the fluid, contained in the vesicles, had been discharged, leaving a dry concave surface, which had already begun to assume a gangrenous

appearance. Ordered the warm turnip poultices (turnips being procured without cost) to the limb, and the strengthening diet, as before; and which has been properly adhered to. From this time, the disease has been gradually increasing, and has assumed the character which you have witnessed.

"I have now written from memory, for my time is so occupied."

From Mr. Bury I have received the following:—

"February 7th, 1839.—Since Mr. Solly and myself visited this child on the 30th ult., the disease has advanced considerably in all four extremities, or, more properly, I should say, disease in the lower, the process of separation (curative) in the upper, limbs. The black patch of gangrene which occupied the left calf on that day, proceeding from the stump upwards, now reaches to within an inch of the flexure of the knee-joint posteriorly; and the death of the whole circumference of this part of the limb is nearly complete. There is a circular line of demarcation apparently being formed, or commencing, about an inch below the knee, as though natural amputation would ensue here. The toes of the right foot are black, and rather swollen, up to a level with the ball of the great toe; mortification evidently coming on, and threatening this leg.

"The left arm separated on the first of this month, (February,) about midway between the shoulder and elbow, in the situation delineated in Mr. Solly's sketch; the soft parts below this to the elbow, together with the entire fore-arm, hand, and their

bones, dropping off in one loathsome mass, and leaving a stump of most singular appearance. Below the site of nature's amputation of the soft parts, the feeble granulating stump of which gradually slopes downwards upon the bone, the shaft of the os humeri projects, uncovered, as far as its distal extremity.

"The soft parts of the right arm, below the corresponding point of separation in that of the opposite side, as seen in the sketch, came away on the 5th instant, along with the superior portion of the ulna; which latter has detached itself at the elbow. A stump is thus exhibited, similar to that of the opposite member, with the lower half of the bone of the humerus also similarly denuded. Thus, if I may venture so to speak, nature has divided both ossa humeri in her amputations of these arms, at the articulations of the elbow, whilst she has made her incisions of the softer textures three or four inches higher up. Though, perhaps, unequal in our eyes to our present art, yet how beautiful is the ingenuity of her work.

"The gangrene has returned, I am sorry to say, on the nose, and seems disposed to spread there; the entire apex being involved. Some swelling and redness are visible beyond the gangrenous portion.

"There continues the same brightness and tonic expression of the eyes which has been so remarkable hitherto; and, to-day, there is a slight general suffusion of both cheeks, scarcely amounting to a flush. The child having lately had

a better supply of nutriment, with ammonia, quinine, &c., may account for this last symptom, as well as probably for the separation of the upper extremities having taken place more rapidly during the past week than this extraordinary process, in this most extraordinary case, would seem to have done heretofore.

"February 12th.—During the last five days, the progress of the mortification has been arrested in the lower extremities, and in the nose also. The great toe and two middle toes of the right side are black, dry, and shrivelled; and it is uncertain where the death of the parts will stop, there being no line of boundary. The disease of the left leg, or rather stump, is quite at a stand still, the line of demarcation still existing, as on the 7th; but there is no ulceration here, nor discharge, the whole gangrenous portion below being contracted and shrunken into a dry, black crust. The granulating surfaces on both stumps of the arms, however, discharge freely a tolerably thick and healthy pus, and look as before. Within the last few days, the patient has lost his appetite, having partaken of nothing but dry bread, with a little weak wine-and-water. There is, nevertheless, very little change in the countenance, or in the condition of the pulse; which latter, in truth, would barely admit of reduction in tone or power. The bowels continue to act with regularity; nights as sleepless as formerly. Notwithstanding the diminished action in the parts, as stated in to-

day's report, the little sufferer is just as solicitous as ever to have the adjoining skin rubbed by his mother's hand at each time of exposure; and relief of the pain is evidently derived from her so doing. I this day examined the state of the arteries of the lower limbs, as carefully as the crying and restlessness of the poor child would allow me; but was unable to detect, by the touch, pulsation in either the inguinal or popliteal spaces. He screamed so piteously, at the approach of the stethoscope to his chest, that I was obliged to abandon the attempt of listening to the heart's action.

"Two years ago, two front teeth of the upper jaw decayed and fell out; but the others are now remarkably sound, and the child has the full complement for its years.

"The chief pain has been felt throughout in the lower extremities; little or none in the upper.

"February 18.—The dead parts on the left leg are nearly cast off, both the tibia and fibula being denuded about three inches below the knee, by the progress of ulceration, through the line of demarcation. The granulations here are filled, as the others elsewhere have been, but secrete a healthy pus in abundance. They descend obliquely downwards, from the sound integument, nearly two inches, and terminate over the naked bones more abruptly than those in the upper extremities. These latter are gradually healing, and continue to discharge. On the right one a small black spot ap-

peared three days ago, which threatened to spread in the manner recently observed in the left leg; but happily it has at present terminated in a superficial dry crust or scab, such as the tip of the nose also presents at this time. Both phalanges of the right toe have dropped off; and the granulated surface exposed looks well, and is inclined to discharge. The two central toes are black and dry up to the first phalanx, and will probably separate at this point. There is no improvement in the child's appetite, and he gets no more sleep at night. He dozes off for a few minutes together in his mother's lap by day. The countenance is certainly paler, and less indicative of vital power. So, likewise, I judge from the visible action of the carotid arteries; which, as well as that of the temporals, is too feeble to bear the pressure of the finger. The only solid food taken is plain bread; but he drinks beer plentifully, which has been always preferred to wine, or wine and water. Motions from the bowels, and urine, natural.

"February 23.—The dead parts attached to the left leg were thrown off on the 18th; the granulating surfaces, both here and on the upper extremities, have a healthy appearance; a copious discharge of good pus; and are gradually contracting. The two distal phalanges of each affected toe have separated, and left discharging and pretty healthy wounds. Those bones that are stripped of their coverings, and project beyond their respective stumps, namely, the ossa humeri, and left tibia, and

fibula, are becoming dryer, and apparently lighter in weight as well as in colour, and present a spongy appearance; but they are none the less sensitive, each dressing (with poultices still) giving rise to sad cries from the little creature, the bones of the leg more especially. Some amendment is to be reported in the appetite, meat and broth having been resumed.

"March 1st.—The child's appetite is as voracious as ever. Both arms continue cicatrizing; the left leg and right toes are much the same. Immediately below the granulations of the stumps, the bones look white and shrivelled, and exhibit minute perforations, as though nature were endeavouring to cut through them at these parts.

"March 29.—Since my last visit, the reparation of the three extremities, that have undergone amputation, has been progressive, and remarkably good stumps are now nearly completed. There are on each healthy granulations, which are reduced to mere points, and discharge proportionably little of good pus. The projecting bones respectively belonging to each stump have become detached at the situations, most favourably corresponding to the previous division of the soft parts, that is to say, just above the line of the granulating surfaces; by the healing of which, so far as it has hitherto proceeded, their divided ends are nicely covered over. The right os humeri was detached on the 6th; and the left, on the 9th; the fibula, on the 10th; and the tibia, on the 15th. The stump of the left

arm, certainly, promises to be rather conical; but those of the leg and right arm will be fleshy and round, equally so with many stumps I have seen after amputation by surgical art. The wounds on the toes of the right foot are quite healed. The child has improved in looks, and gained flesh; the appetite is exceedingly good, and all the natural functions are well performed, sleep even included.

"It is both curious and melancholy to witness the poor little fellow rubbing the stumps of the arms, when the dressing is removed, against his face, in order to allay the itching still felt; and the manner in which he took and held, in his mouth, a penny I gave him."

On the 22nd of April I again visited the case. When I found, to my astonishment, that nature, unassisted by the surgeon, had amputated the three extremities, and formed stumps, which might shame many formed by the operator's knife.* The stump of the right arm was as perfect as could be desired; the bone in the left projected slightly, but was in the course of removal by absorption. The stump of the left leg was nearly healed, with a very slight granulating projection opposite the bone. The child's health was much improved, his spirits good, and he was freer from pain.

In this case the progress of the disease seems to have been identical with that which is usually observed in senile gangrene: for instance, its first ap-

* See Plate III. fig. 2.

pearance was a dark coloured spot, unaccompanied with pain or swelling, or increase of heat in the part; and very slight redness at the line of demarcation, between the healthy and diseased portions of the limb.

Dr. Carswell, in his admirable article "Mortification," in the Cyclop. of Medicine, observes, "that it is stated, by pathologists, that this form of mortification sometimes occurs in young persons;" but that he himself has never seen it in young persons, and considers it a statement which has not been supported by facts, and I have not myself been able to meet with any case which bears any analogy to it.

STATISTICAL NOTICES

OF

ONE HUNDRED AND TWENTY CASES

OF

CARCINOMA UTERI,

WITH

REMARKS.

By J. C. W. LEVER, Esq.

Communicated by Dr. CLENDINNING.

READ JUNE 11TH, 1839.

The value and utility of the numerical system, in ascertaining the history of disease in different ages and countries; in testing the comparative merit of different modes of practice; and in demonstrating the liabilities of each sex or profession to various maladies, are now acknowledged by many of our most talented and zealous practitioners. The patient and interesting labours of M. Louis have tended, in a great measure, to effect this change in the opinions of the profession.

Sincerely believing that the only sound foundation for all knowledge is a careful and extensive accumulation of facts, I have ventured to bring together, in

a tabular form, the prominent particulars of 120 cases of carcinoma uteri, all of which have occurred under my own surveillance. I might have added many more to the table, but I have preferred adducing those only for whose particular phenomena I alone could be responsible.

Before I entered upon this investigation, I held many opinions with regard to this disease, totally opposite to the deductions which are to be drawn from the table, thus affording a strong argument in favour of medical statistics, viz., the assistance they render us in testing our opinions, whether they be correct or erroneous.

All modern writers agree in denouncing carcinoma uteri as a truly malignant disease: and in framing the table, I have purposely avoided including any case of simple hard tumour of the mouth and neck of the womb, or hard tumour of the walls, lest there should arise any difference of opinion as to its nature and malignancy. My investigations have been entirely confined to that disease of the uterus which all agree in naming "Carcinoma," and which never fails to develope its malignant and fatal termination.

This disease occurs more frequently than at first thought we might be led to expect; the registers of the obstetric out-patients of Guy's Hospital show that the proportion of cases of carcinoma uteri to cases of other uterine diseases, is nearly as 1 in 7, or 13·5 per cent.

The table will be found to contain the recorded history of one hundred and twenty females; the co-

lumns show the ages of the patients, whether married or single, or widowed; if married, the ages at which they married; the number of children they had borne; the number of conceptions that terminated abortively; their complexion; the length of time they had laboured under the malady previous to their application for advice; the state of their uterine health in early life; and the duration of the disease, from the period of its attack to its termination in death.*

I shall make a few remarks on each column, in the order it stands: and first as to

Age.—It will be found that the ages of the patients were as follows:—

Between 25 and 30 years	3·3 per cent.
30 — 35	15·
35 — 40	10·83
40 — 45	20·
45 — 50	20·
50 — 55	13·3
55 — 60	14·16
60 — 65	0·83
65 — 70	1·6
70 — 75	0·83

It thus appears that the period of life most obnoxious to this disease, is from the 40th to the 50th year.

Condition.—Single women bear a proportion of

* The Tables from which the following deductions were derived were presented to the Society.—EDITOR.

5·83 per cent., married women 86·6 per cent., and widows 7·5 per cent., affording a complete refutation of the statement, that celibacy favours the development of the disease.

Ages at Marriage :—

34·16 per cent. married between the ages of	15	and 20
36·66	20	25
20·83	25	30
1·66	30	35
0·00	35	40
0·83	40	45

Number of Children.—The number of children produced by 113 married women amounted to 596, of whom 301, or 50·51 per cent., were boys, and 295, or 49·49 per cent., were girls. If from these 113 married women, we deduct 10 who had borne no children, we have 103 bearing-women, to produce 596 children, rather more than 5¾ to a marriage. One of the sterile women married under 20 years of age, seven under 30 years; one under 40 years, and one at the age of 44 years. Ten barren women out of 113 will amount to 8·8 per cent. This per centage exceeds the average of barren women, for it has been found that 1·20th, or 5 per cent., of married women, are wholly unprolific.

Abortions.—Forty per cent. of the females had miscarried. The collective total of their abortions were 122, an average of rather more than 2·54 to each woman. Adding the miscarriages to the

number of children born, we shall have the number of conceptions, and we shall find, that out of 100 conceptions, the abortions were nearly 17, or, more correctly, 16·8.

Complexion.—The number of light complexioned women affected with this malady, amounted to 20·8 per cent., while those who are recorded as being of dark complexion, amounted to 79·16 per cent.

State of Uterine Health in early Life.—Only 25 women, or 20·8 per cent., had enjoyed good uterine health in early life, while 95, or 79·16 per cent., had suffered either from (what is termed) functional disease, or syphylis. The most frequent malady was dysmenorrhæa, with which no less than 66 had been afflicted.

The proportions stand thus:—

	per cent.
Those who had had good uterine health . .	20·8
Those who had suffered from amenorrhæa .	15·8
——————— Vicarious Menstruation .	0·83
——————— Menorrhagia	1·66
——————— Dysmenorrhæa	54·16
——————— Syphylis	6·6

Duration of the Disease, and Termination.—Death occurred in 107 cases, the average duration of the diseases being 20¼ months. The shortest duration of the disease was 3 months, the longest 66 months. In single women the average duration of life was 21·66 months; while in married women, who had borne no children, it was 21·3 months. In females who in earlier or later life had suffered from Dys-

menorrhæa, the average duration was 19·7 months; in those who had suffered from syphylis, 21 months; from amenorrhæa, 22·9 months, while in those who in early life had enjoyed good uterine health, it was 22·59 months.

In concluding these remarks, I am quite aware of the deficiency of the tables in several important particulars, viz., hereditary predisposition; symptoms, especially the order in which they occur; the post-mortem appearances of those who have died; and, lastly, treatment; but on some future occasion I hope to supply information on these several points. In six patients only have I been able to trace the existence of carcinoma in the maternal parent, four were affected with carcinoma uteri, and two with carcinoma mammæ; this, however, must not be regarded as an average or proportional number, for many women could give no account of their parents, while others stated their mothers to have died from diseased womb, without being able to state the precise disease.

It would also be a matter of great practical importance, to collect information on the order in which the various symptoms of this distressing disease occur, so that we may be enabled, by the existence of certain symptoms, to suspect the nature of our patient's malady, even though she may refuse us the more tangible evidence of vaginal examination.

As I possess the particulars of but few post-mortem examinations, I have thought it better to reserve them, as they are insufficient to establish any

general conclusions. The treatment of this disease may be considered under the heads "curative" and "palliative;" the termination of the cases gives us no warrant to speak of the former, but nevertheless, much may be done in the way of palliation; and to determine the relative value of this class of remedies will be my object on a future occasion.

CASE

OF

A GIRL WHO VOIDED FROM THE URETHRA

A NUMBER OF

ENTOZOOTIC WORMS,

NOT HITHERTO DESCRIBED,

WITH

AN ACCOUNT OF THE ANIMALS.

By T. B. CURLING,

ASSISTANT SURGEON TO THE LONDON HOSPITAL, ETC.

READ JUNE 11TH, 1839.

May 31, 1839, I received from Mr. Drake, surgeon, of the Commercial Road, a number of small worms contained in urine, which had been voided a few hours previously by a little girl, his patient, accompanied with a request to know their nature. The following is the account he gave me of the case.

The girl, who is five years of age, had enjoyed good health until June 1837, when she had an attack of inflammation of the lungs in a sub-acute form, attended by a peculiar hollow cough, and a deranged state of the intestinal mucous membrane. She has

been subject to this cough ever since; a slight cold or derangement of the bowels being sufficient to bring it on. She has likewise been occasionally troubled with the small ascarides. At the beginning of May she had an attack of measles, which left her weak and much emaciated. A troublesome cough remained, attended with fever of a remittent character, and her urine was high-coloured and scanty in quantity. Under mild antiphlogistic treatment the fever diminished, and the urine assumed a natural appearance.

May 26th. Some small worms were first observed in the urine this day, and for several succeeding days, on rising in the morning, she voided, from the urethra, seven or eight.

June 1st. Several ascarides vermiculares were observed in her motions, but no worms were discovered in the urine this day or the following one. They were again observed, however, on June 3rd; and several have occasionally passed since, in the morning.

11th. The cough has left her, and she is rapidly improving in health and strength. She has never suffered from any affection of the urinary organs.

I found the urine in which the worms were contained high-coloured and slightly acid. It was observed, that when first passed they floated separately in the urine, but in a short time they coalesced and coiled themselves up together in the form of a ball, at the bottom of the vessel, and it was with difficulty that they could be separated.

When they were disturbed their motions were often very lively; and if allowed to remain in the urine they lived for two or three days. They were very transparent, so that the contents of the alimentary canal could easily be distinguished by the naked eye. On immersing them in spirits of wine they soon became white and opaque. They were of two sizes; the larger worms being more numerous than the smaller.

A slight examination at once convinced me, that these worms could not belong to any of the species of entozoa at present known to infest man; and, considering the period of the year, I was at first induced to imagine that they must be the larva of some insect. On placing one in the field of the microscope, I recognized a beautiful organization, and true nematoid structure; and, on reference to Rudolphi's Synopsis Entozoorum, and other works on this subject, I discovered that it was an entozoon which had not hitherto been described. Having received several of these worms from Mr. Drake, at different times, I have had an opportunity of making repeated examinations of them by the aid of the microscope, in which I have had the advantage of the kind assistance of Professor Owen and Mr. John Quekett. The animals being alive and active, formed very interesting objects, as we could readily see and watch the curious actions taking place in their interior.

The worm* is of a light colour, cylindrical in its

* See Plate IV. figs. 1, 2, 3.

form, and annulated, and tapers slightly towards both extremities, but chiefly towards the anterior, which is the smaller. The female measures about $\frac{4}{5}$ths of an inch in length; the male, as is the case with most of the nematoid worms, is much smaller, being about $\frac{2}{5}$ths of an inch long. They vary, however, a good deal in size, especially the males. The head of the worm is obtuse and truncated, and has an orbicular mouth. The mouth is generally not very apparent, and several worms were examined before I succeeded in discovering it. The neck is distinctly annulated. The tail is obtuse and also annulated, but not so much so as the neck. The tegument is a delicate transparent structure, containing two layers of fibres, one circular and the other longitudinal, both of which I believe to be muscular. After the rupture of a worm which had been in dilute spirit, these fibres were seen with great distinctness, projecting at the injured part. The tegument is armed with a number of sharp-pointed spines, arranged in clusters of three or four, and sometimes five, in longitudinal equi-distant rows. The intervals between the spines in each row, measured by means of the micrometer, were found to vary from $\frac{1}{50}$th to $\frac{1}{70}$th of an inch. With the exception of a small part of the body to be noticed presently, the tegument was completely defended by these spines, which were detected as near the head as the third ring, and also close to the extremity of the tail. It was generally observed that, at the anterior part of the body, the spines were

directed posteriorly, whilst about the centre they projected outwards, and near the tail pointed towards the head. On examining the worm slightly compressed between two pieces of glass in the field of the microscope, I often obtained a lateral view of the spines attached to the sides of the animal, and I could then very distinctly discern their motions, the animal having apparently the power of protruding and retracting them at pleasure. The spines are attached to the external tegument, into which, when retracted, they are received; and they appear to be moved by a number of fibres radiating outwards, in the substance of the tegument. The alimentary canal appeared, on some occasions, of a light yellow colour; on others, it presented a brownish hue. Upon examining a large female worm, the alimentary canal appeared to commence at the mouth, by three small convoluted tubes, which were shortly afterwards united into a single one. The single tube, after proceeding for some distance in a tortuous course, became sacculated, and, enlarging as it descended, it terminated at the extremity of the tail in a trilobular aperture, the anus. On one occasion, I saw very clearly the opening and closure of this orifice. The commencement of the alimentary canal by three tubes was not always apparent, and for some time I imagined that it began by a single tube. The motions of this canal were extremely beautiful. It moved freely in the interior of the animal, at one

time becoming straight and at another time convoluted, as the body of the worm was extended or diminished. It also moved backwards and forwards in an extraordinary manner, and the sacculi were seen to close and dilate by a sort of peristaltic action. On each side of the alimentary canal, at its commencement, there is a series of lobulated bodies, the structure and office of which I could not make out. They were of a light colour, and accompanied the œsophagus in its lively movements in the longitudinal direction. In several male worms a band was seen running along the centre of the intestinal canal, being lost near the anus.

By the side of the alimentary canal, and sometimes crossing it obliquely, I observed in many instances, especially in the female worms, a distinct tube of a faint light colour, marked by transverse bands, which seemed to have independent motions, somewhat of a pulsating character. It was generally seen near the anterior part of the body, but it could be traced for some distance towards the posterior. The pulsating character of this tube was first determined by my friend Mr. Owen; the pulsations occurred at intervals of from eight to twelve seconds. This tube forms, in his opinion, the analogue of the dorsal artery of the annelida. In several worms I could distinctly perceive two light-coloured vessels twining round the alimentary canal near the head, which gave off lateral branches, and afterwards, joining, formed a single trunk, which also sent off

branches from its sides. Between the intestinal canal and external tegument I could distinguish, on numerous occasions, an extremely rapid circulation of minute globules which passed in two contrary directions, side by side, in a continuous stream. This was observed at intervals nearly the whole length of the animals, being frequently obscured by the movements of the digestive tube. I could also discern, near the tail, a number of globules passing slowly in longitudinal and transverse currents, and crossing the alimentary canal.*

The structure of the female worm is much more complicated than that of the male. The vulva is situated near the anterior extremity, about one-fifth of an inch from the head. It appears like a mamillated process, is somewhat opaque, and can be discerned by the unassisted eye. The animal swells at this part, the tegument is thicker, there are no spines, and, for a short distance above and below the vulva, the body is encircled by a series of regular dark-coloured fibres. About mid-distance between the head and vulva, and on opposite sides of the digestive tube, I invariably found, in the numerous microscopic examinations which I made of the female worms, two oval granular bodies or glands. Imme-

* The worm became so opaque after immersion in spirit, and decomposed so rapidly, that much of the beautiful organization that I have described became lost to the observer shortly after death. I attempted to preserve some in salt and water, and in dilute vinegar, but without any better result.

diately below these oval bodies, there are two slightly convoluted tubular processes. It was a long time before I could make out the structure of these processes; but after repeated investigation I found that each terminated at one end in a free extremity, of a bell shape, and brownish red colour, which was beautifully fimbriated. This free extremity moved about in the interior of the animal in various directions with great freedom; and the difficulty of making out the structure of these bodies was chiefly owing to the diversity of shape and appearance which under these circumstances they presented. They probably had some connection with the alimentary canal, as they accompanied it in its frequent movements in the longitudinal direction. From the other extremity of each of these bodies there appeared to proceed a small convoluted tube, and the two, after running together for a short distance along the digestive tube, joined the oviducts; but this junction was not very clearly seen. The oviducts consisted of two small tubes which were distinctly traced commencing at the vulva, and then twining in a very tortuous manner around the alimentary canal, about as far as half way between the anus and vulva.

I made many careful examinations of the smaller worms, but I could distinguish neither penis nor any genital apparatus whatever; though, in some of the specimens, I observed, near the anterior extremity, dark-coloured transverse lines, similar to those marked in the vicinity of the vulva in the female. Can these be young worms, the sexual

organs of which have not yet been developed, or are they not animals of the male sex? There is certainly not sufficient evidence to warrant any positive conclusion; but, inasmuch as in most of the nematoid worms there is the same disparity in the sizes of the two sexes, as in those of the worms in this case, and, with the exception of the dark lines just alluded to, as the smaller specimens exhibited no trace of the complicated structures remarked in the female, I have preferred considering them, at present, as belonging to the opposite sex.

From the above description, those conversant with the structure of the entozoa, will readily recognise a true nematoid structure. These worms differ, however, from all the known genera of this class, not only in wanting the characters by which they are distinguished, but in possessing several peculiarities in structure, namely, a well-marked annulated body, an anal aperture of a labiated form, and a tegument armed throughout with spines. Referring, therefore, this entozoon to the order Nematoidea of Rudolphi, in which it would constitute a new genus, its character may be thus described:

Genus Dactylius.*

Corpus teres elasticum annulatum et utrinque attenuatum, caput obtusum os orbiculare, anus trilabiatus.

* From δακτύλιος, annulus.

Dactylius aculeatus.

Capite obtuso, toto corpore aculeorum serie multiplici armato, caudâ obtusâ et annulatâ.

Hab. in Hominis vesicâ urinariâ.

Spines are found attached to the head in many different species of the entozoa; but the existence of these curious dermal processes on the body has been observed in only one worm of the nematoid class, the strongylus horridus, an animal found by Rudolphi in the œsophagus of the water-hen. In this worm they consist of reflected hooklets, and are arranged in four longitudinal rows, but they are only continued for a short distance along the body, and, in the representation given of them,* appear to be single instead of occurring in clusters, as in the dactylius aculeatus. Professor Owen, in speaking of these epidermic processes, which he considers serve as prehensile instruments to retain the proboscis and the worm in its position, remarks, "when they are spread over the surface of the body, they may have the additional function of aiding in the locomotion of the species, analogous to the spines which arm the segments of the œstrus, which passes its larva state, like any entozoon, in the interior of the stomach and intestines of a higher organized animal."†

* Entozoorum Historia Naturalis, vol. i. tab. 3, figs. 8 and 9.

† Cyclopædia of Anatomy and Physiology, Art. Entozoa, vol. ii., p. 127.

The dactylius aculeatus will probably be regarded as possessing greater zoological than pathological interest.

The only nematoid worms of the class previously known to infest the urinary organs of man, are the strongylus gigas and the spiroptera hominis,* from both of which the dactylius differs in many important particulars.

It is worthy of remark that, in this case, there was no corresponding derangement of the urinary organs, the discovery of the worm in the urine having been quite accidental. This seems, therefore, to be another example, in addition to those afforded by the trichocephalus dispar, and trichina spiralis, of worms infesting man without causing any symptoms or exerting any injurious effect on the part where they exist, and being developed apparently in a healthy condition of the tissues. I believe that parasitic animals occur in the human body far more frequently than is generally supposed, being commonly overlooked from the minuteness of their size. In support of this opinion I may remark, that the species of entozoa which is present in man more commonly perhaps than any other, the trichocephalus dispar, was not discovered till the middle of the last century, and until very recently was scarcely known in this country. Dr. Baillie, after describing it, states, "it is not only rare in this country, but I

* The worm voided by the woman whose case is described by Mr. Lawrence in the second volume of the Society's Transactions.

believe in every other;"* and Dr. Hodgkin observes, "though I have frequently and carefully sought for this worm, I have only once been able to find it."† Yet, if diligent search were made, one or more would probably be found in the large intestines of most bodies after death. Dr. Bellingham of Dublin examined successively the intestinal canal of twenty-nine individuals who died in St. Vincent's hospital, and in twenty-six out of the twenty-nine he found a greater or less number of these worms.‡ During the last winter they were detected in many of the bodies examined at the London Hospital; indeed, in nearly all the cases in which much pains were taken in looking for them, in the intestinal canal of healthy persons destroyed by severe injuries, as well as of those cut off by acute and chronic diseases. Mr. Cooper, surgeon, of Greenwich, has furnished me with an account of seventeen cases in which he searched for the trichocephalus, and of these it was found to be present in eleven. He states that he has observed it many times since, but he has kept no account. In one instance he found as many as twelve, and in another eight. Though the trichocephalus generally inhabits the cæcum, it was ob-

* Engravings to illustrate Morbid Anatomy, p. 89.

† Lectures on the Morbid Anatomy of the Serous Membranes, p. 207.

‡ Dublin Journal of Medical Science, vol. xii., p. 346. In a more recent number of this Journal Dr. B. states, that he detected the trichocephalus in forty-nine cases out of fifty-five.

served, also, in these cases, in various parts of the colon, and in the appendix vermiformis. The frequency of these worms has been well attested by numerous observers both in Germany and France; and, during the fearful ravages of the cholera at Naples, it was ascertained by M. Thibault that they existed, not only in the bodies of all persons dying of this disease, but as constantly, also, in the intestinal canal of individuals destroyed by other affections. In the inspection of the bodies of eighty persons dead of various diseases, the trichocephalus was found in all of them without exception.*

Whilst Mr. Quekett and myself were engaged in examining a specimen of the dactylius, we detected, floating in the urine around it, an animalcule of an oval shape, furnished with eight orbicular spots, and a central cavity or depression, which moved about freely in the fluid, by means of a series of fine vibratile cilia arranged around the body.† This animalcule must be referred to the polygastric infusoria. Its occurrence in the urine, in full activity, is a circumstance not devoid of interest.

P. S. The morning after the paper had been read at the meeting of the Society, Mr. Drake, at my suggestion, administered to his patient small doses

* Encyclographie des Sciences Medicales, Aout 1837. Sociétés Savantes, p. 183.

† See Plate IV. fig. 6.

of the oleum terebinthinæ, and from that time no worms, either living or dead, have been observed in the urine. For a few days previously, however, the worms had been passed less frequently, and in smaller numbers.

T. B. C.

June 26.

REMARKS

ON THE

ACUTE FORM

OF

ANASARCOUS TUMOUR

OF THE

SCROTUM.

By R. LISTON, Esq.,

SURGEON TO THE NORTH LONDON HOSPITAL, ETC.

READ JUNE 11TH, 1839.

Mr. Pott, in his admirable treatise on hydrocele, has noticed the diffuse watery tumour of the scrotum as a not unfrequent attendant on general dropsy; and while he mentions the necessity which occasionally arises of unloading the cellular tissue, so as to reduce the size of the swelling, and ward off mortification, he points out the danger occurring from doing so by free incisions. To illustrate the subject, he has related three cases; in all of which sloughing, to a great extent, followed this proceeding; the testicles were denuded, most alarming symptoms supervened, and one of the patients perished in consequence.

Mr. Pott advises punctures to be made, in order to empty the cellular tissue; the benefit accruing from this practice, in favourable cases, is well appreciated by the profession: but it appears that in one case, where even this method was followed, sloughing, to such an extent as to uncover the testicles and cord, occurred, and was followed by the death of the patient.

I propose to bring under the notice of the Society, briefly, a few cases of a different character from those above alluded to; cases of rapid distension of the scrotum with serosity, in which destruction of the cellular tissue and skin can, on the contrary, be arrested only by very early and free incisions.

This distension is or is not attended by redness or erythema of the surface; but there is reason to think, from the suddenness of the accession, and from the appearances on exposing the cellular tissue, that there is no actual inflammation of its texture; there being no induration, nor any appearance of lymph or puriform fluid in the areolæ.

The affection has generally supervened upon abscess or ulcer, perhaps trifling, in the perinæum or groin. Its accession has been sudden, the swelling and tension becoming very great and alarming even within a few hours. The most dependent part, generally the posterior, will be found at a very early period to present one or more deeply-seated ash or tawny-coloured spots; these extend; the integument is speedily involved; and, unless active measures be adopted, the entire coverings and investments of

the testicles will be destroyed, and these organs exposed.

The progress of the case will depend materially upon the state of the patient's system, and upon the nature of the infiltration. Cases of œdematous swelling of these parts, the result of injury or of irritation in the neighbourhood, are continually occurring, in which none of these dreadful consequences arise, or need be feared. But in hospital practice, in some of those in the working classes, perhaps badly fed and clothed, or cachectic from any cause, and during unhealthy seasons, whilst erysipelas is prevalent, the surgeon will do well to look with suspicion at any sudden swelling in this region, and be prepared to treat it actively.

The fluid effused, and which falls, as it were, into the cellular tissue of the scrotum, is often dark, putrescent, and acrid: it causes destruction of all the parts it comes in contact with, and subsequently of the skin, as certainly, and sometimes as rapidly, as if the parts were infiltrated by urine. Cases of sloughing of the coverings of the genital organs are very generally supposed to arise only from this latter cause; and it is with a view of directing attention to the diagnosis, that the following cases are brought before the Society.

The same treatment, it is true, is so far required in either case. The scrotum must be freely opened at the point, where, in consequence of the pressure being greatest, the destructive process has commenced: but of course, in the acute anasarcous

tumour, or as it may, in some cases, very properly be called, inflammatory œdema, there can be no occasion for interference with the urinary passage, by the application of instruments, either from without or within.

The history of the case, and the absence of a hard tumour in the perinæum, which attends upon and very generally precedes infiltration of urine, will enable the surgeon to form a correct opinion of the nature of the mischief, and to direct his procedures properly and satisfactorily.

CASE I.

J. A., aged twenty-three, sailor. Admitted into the Edinburgh Royal Infirmary March 1834.

He had been shipwrecked on the coast of England, and exposed to the inclemency of the weather for many hours. He afterwards travelled on foot, towards the North, in great distress, scantily clothed, and badly fed. An abscess had formed near the verge of the anus, for which he applied for relief at the Hospital. The opening of the abscess, which was anterior to the orifice of the bowel, and superficial, was somewhat enlarged. Two days afterwards the scrotum was found much swelled: the swelling had come on suddenly during the night. At the visit at twelve, A.M., there was a slight erythema of the perinæum, and the scrotum also was reddish, shining, and much distended, with a grey appearance at the lower and back part. Free incisions were

made on each side of the septum, and slight sloughing of the skin and cellular tissue took place.

The after treatment consisted in the exhibition of antimonials, followed by bark, and the patient made a rapid recovery.

CASE II.

J. M., aged fifty-four, saddler. Admitted into the Royal Infirmary April 7th, 1834.

He states that he has been out of employment for three or four months; and, in consequence, he was obliged to travel a good deal in all weathers, exposed to cold, wet, and hunger. About a month ago the scrotum became red, painful, and swollen. The swelling increased rapidly, and gangrene followed, leaving the parts in much the same state as on his admission into the Hospital. He had inguinal hernia on both sides; that of the right side was the largest, and had existed for eighteen years. Both were reducible previously to the sloughing of the scrotum; but, since then, he has been unable to return the intestine on the right side.

On admission into the Hospital, the coverings of the testes were found to have been entirely destroyed; both of them, with about two inches of the cord on the right side, and half an inch on the left, being completely exposed, and covered with unhealthy granulations, which discharged a thin serous matter. In both groins there were several openings, with sinuses leading from them in different

directions. His thighs and hips were much excoriated. He was emaciated, and had an unhealthy appearance. Pulse 90, and of good strength; skin cool; tongue dry, and covered with a brownish fur; bowels regular; much thirst.

This patient recovered under general and local treatment: the former consisting in allowing him (after the secretions were brought into a more healthy state) a simple nutritious diet, and so much wine per diem; and the latter, in first the application of the warm-water dressing, and afterwards, when the parts were in a fit state for it, of the zinc wash.

He was discharged in about two months after his admission. It was interesting to observe the rapidity with which the testes were drawn within the integuments so soon as the cicatrix had reached the middle of these bodies.

CASE III.

W. R., aged forty. Admitted into Royal Infirmary July 21st, 1834.

Received a kick on the perinæum, from a cow, about a fortnight ago. There was much pain at the time; but the injury was followed by no further inconvenience until about eight days ago, when the pain returned, and was followed by considerable and rapid swelling of the scrotum. Nothing was applied to the swelling at the time; but, as it continued to increase, he applied for admission into the Hospital.

Upon examination, the scrotum was found to be much swelled, and extremely tender. At the lower part it was of a dark livid colour; and, on pressing it, an emphysematous crackling was distinctly felt. There was little swelling in the perinæum; but on the right side, about an inch anterior to the rectum, there was a small opening, irregular in its appearance, through which the dead cellular tissue protruded, and a small quantity of what was, at first, believed to be urine, escaped. The pulse was small and rapid; the tongue dry in the centre, and moist round the edges. Bowels reported open; and states that he passes his urine freely. Immediately after his admission free incisions were made into the scrotum, and the opening in the perinæum enlarged. In both places the cellular tissue was found in a state of gangrene; and a considerable quantity of thin fetid fluid, mixed with air, escaped from the scrotum.

The man was an habitual drunkard, and of weak intellect. He gradually sunk, and died on the 28th of July, before the sloughs had separated.

On dissection, the whole urinary apparatus was found in a perfectly healthy state.

The following is an extract from a letter from Dr. Duncan, to whose kindness I am indebted for procuring the preceding cases for me from the Hospital Report Book, and who filled the situation of house surgeon in 1834:—

"There was another case also, but of a very trifling nature, as the slough was quite superficial, and not larger than half a crown: it occurred in a

man named Campbell, at the same time that the other two were in the ward. The man was in the house with slight sores. Erysipelas was at the time prevalent. He was seized with rigors, followed by swelling and pain of the scrotum; which, in twenty-four hours from the commencement of the attack, began to blacken at the lower part. It was immediately incised, and thus the extension of the sloughing was checked.

"At the same time, and in the same ward, there were two cases of urinary infiltration, which contrasted well with the above; but they all recovered."

CASE V.

S. H., a labourer, of spare habit. Admitted into the North London Hospital May 19th, 1835.

The disease, for the relief of which he applied to the Hospital, was an abscess over the knee-joint, which was cured; but, just before he was about to be discharged, he complained, for the first time, of slight pain and swelling in the groin: and, on examination, a small fistulous opening was discovered, surrounded by a blush of inflammation. He then said that the opening had existed for some time. The next day (May 28th) rigors took place; the skin was hot; tongue furred; bowels confined; and the erysipelatous redness extending over the groin and upper part of the right thigh, passing downwards to the scrotum.

On the 29th the scrotum had become very much

swollen, and was attended with discolouration at its most dependent part. The cellular tissue of the prepuce was also much infiltrated.

A free incision was made in the lower part of the scrotum, near the raphé, and the cellular tissue found in a state of gangrene. A small vessel was divided at the lower part of the incision, from which about ʒxv of blood were allowed to escape. Fomentations were applied to the groin, poultices to the scrotum, and twelve leeches to the epigastrium, as he complained of slight tenderness in that region. Warm-water dressing was the next day applied to the wound; and, under this treatment, joined with purgatives, antimonials, and tonics, he recovered, and was discharged from the Hospital on the 14th of June.

CASE VI.

C. P., aged twenty-one, a shoemaker, of sanguineous temperament. In the latter end of December 1837, he received the charge of a gun, loaded with small shot, which entered the lower part of the abdomen, in the left iliac region, and passed out posteriorly immediately above the crest of the ilium, splintering the upper part of that bone in its passage. On the separation of the sloughs an opening was discovered in the colon, at the bottom of the posterior wound, through which the fæces passed.

Five weeks after the receipt of the injury he was admitted into the North London Hospital under my care. By the use of enemata, and the em-

ployment of a compress over the artificial anus, retained by an elastic bandage, the passage of the fæces through the rectum was encouraged. On the 15th of April he was discharged from the Hospital, so far relieved that the anterior wound was healed, the posterior one rendered much smaller, and the fæces made to pass chiefly in their natural course, although a certain portion still escaped by the posterior wound. This circumstance proving a great annoyance, the patient re-entered the Hospital on the 4th of November 1838, with the view of getting rid of it, if possible.

5th.—A circular flap of skin was accordingly raised from the gluteal region, below, and rather to the inner side of the artificial anus, the edges of which were previously removed. The flap being then accurately applied to the opening, was retained by seven points of interrupted suture.

Care was taken that the patient should lie in such a position as to relax the parts implicated.

Adhesion of the flap took place to a certain extent; but, on the 15th, owing to the escape of a quantity of hardened fæces through the opening, the recent adhesions were completely torn through. On the 29th it was attempted, by paring the edges, and introducing curved needles and twisted suture, to produce union of the anterior part of the flap, a space being left posteriorly for the escape of fæcal matter. December 2nd he was attacked with erythema, which, commencing around the opening into the colon, quickly spread over the back, buttocks,

posterior part of the thighs, and round the crest of the ilium, towards the front of the abdomen.

9th.—The scrotum became red, tender, and œdematous. Fomentations were assiduously applied, but the œdema increased rapidly. The anterior part of the scrotum, which, owing to the patient constantly lying on his face, was most dependent, became more discoloured than the rest of the parts affected.

10th.—A free incision was made in the anterior part of the scrotum, through the skin and infiltrated cellular tissue.

11th.—The penis became infiltrated with serum, and the most dependent part (the fore part of the prepuce) became very much swelled and somewhat ecchymosed. The œdema of the parts was so great as to produce phymosis. The prepuce was slit up close on one side of the frænum, and the extreme tension of the parts thus relieved. On the

13th.—The sloughing of the scrotum and prepuce became circumscribed by a distinct red line, round which there was considerable hardness of the tissues.

Warm, moist applications were employed to favour the separation of the sloughs, and, as the patient was debilitated, his strength was kept up by wine and light nutritious diet.

18th.—The sloughs separated completely. The loss of substance from the scrotum was considerable, so that the testicles, covered by the tunicæ vaginales, were exposed to view.

The parts were now dressed with sulphate of zinc

lotion, and the tone of the system improved by the exhibition of tonics, &c.

Under this treatment the sores gradually healed, and the patient was discharged cured on the 29th of January 1839.

AN ACCOUNT

OF A

FŒTUS OF SEVEN MONTHS,

WITH ITS

PLACENTA PARTIALLY ADHERENT TO A NÆVUS OCCUPYING THE SCALP AND DURA MATER.

By ROBERT LEE, M.D., F.R.S.,

PHYSICIAN TO THE BRITISH LYING-IN HOSPITAL, AND LECTURER ON MIDWIFERY AT ST. GEORGE'S HOSPITAL.

READ FEBRUARY 12TH, 1839.

The following letter, which I received on the 23rd August 1838 from my late pupil Mr. William Highmore, explains the object of the present communication:—

"Sherborne, Dorsetshire, August 21, 1838.

"My dear Sir,

"I have the greatest pleasure in sending you a curiously malformed fœtus, which was expelled from a lady in the seventh month of gestation, in my uncle's practice, yesterday. My uncle was sent for; but, being from home, and the case being urgent,

another practitioner was called in: who, on his arrival, found the head of the child born; the body and placenta were then expelled together, I suppose; and the funis was divided before it was discovered that it was adherent to the forehead. When my uncle arrived, he found the labour over, and the lady comfortable; the gentleman who attended her being still with her. On examining the child, which appears to have died during the delivery, he discovered that the funis, which was very short, was firmly adherent to the forehead, the skin of which is very vascular, and the other malformations of the face and hands, which you will see. The head was not examined, in order to give you an opportunity of doing with it as you think proper. I am sorry it is not in my power to give you the history of the case now, but will procure it for you before I leave the country. Mrs. ——, it appears, was frightened, about the period of quickening, by a cat leaping on her head as she was stooping down to tie her shoe.

"Believe me, my dear Sir,

"Yours very truly,

"WILLIAM HIGHMORE.

"To Robert Lee, Esq., M.D.,
14, Golden Square, London."

The fœtus and placenta, having been enclosed in a bladder half filled with water, arrived without injury, and before decomposition had commenced. They were placed in a vessel filled with water, while

Mr. Joseph Perry was engaged in making the drawing presented to the Society. A pipe was then introduced into the umbilical vein of the divided extremity of the cord connected with the placenta, and all its veins and arteries were minutely injected. The arteries and veins of the fœtus were then filled with injection from the extremity of the umbilical vein connected with the navel. The integuments of the head were then divided from ear to ear, and the dura mater was found in immediate contact with these, and all the bones of the upper part of the head were wanting. The scalp and dura mater on the upper part of the head were almost wholly occupied with a great plexus of dilated arteries and veins, filled with injection, and presented the appearances usually observed in cases of nævus, spread over a considerable portion of the surface of the body. The arachnoid and pia mater had nothing unusual in their appearance, and the brain was perfectly healthy.

Being anxious to determine the exact structure of the band uniting the placenta and forehead, near the root of the nose, and to ascertain whether any connection, by blood-vessels, existed between them, I availed myself of the kindness of Sir Astley Cooper to examine the parts carefully along with him. We found this band about three quarters of an inch in breadth, and an inch and a half in length, composed of the amnion and chorion, which passed off from the placenta, near the entrance of the umbilical cord, and were firmly inserted into the integuments of the forehead, as the amnion and chorion, which

form the sheath of the umbilical cord, are usually united to the integuments around the navel of the child.

We also found an opening sufficiently large to admit the point of a finger, through the integuments of the forehead, where they were united to the amnion and chorion; and, through this opening, the dura and pia mater protruded, and were lodged in the centre of the band, forming at the part a hernia cerebri, of which the band, extending between the placenta and forehead, was the only covering.

We could not discover any arteries or veins, either empty or filled with injection, running in the cellular membrane of this band, and therefore concluded that no vascular communication existed between the placenta and fœtus at this part.

Near the root of the nose there was an irregular shaped opening on the left side, and both eyes were wanting.

There were only three fingers and a thumb on the right hand, and the fore and ring fingers of the left hand were imperfectly formed.

All the thoracic and abdominal viscera were healthy.

The umbilical cord measured about six inches.

That the adhesion of the placenta to the head of the fœtus, in this case, was not accidental, nor the consequence of inflammation, must be obvious to all; but at what stage of the development of the embryo it took place, and by what process it was effected, it will perhaps be impossible to determine,

until a more perfect knowledge of the origin of the amnion is obtained. The umbilical cord and band must have been formed at the same time, when the embryo and amnion were in immediate contact, and probably before the end of the third week after conception.

Paul Portal has described and figured a malformed fœtus, between the integuments of whose forehead and the placenta there passed a long slender band, formed of the amnion and chorion; the eyes of the fœtus were closed and deformed; the feet clubbed; the ring-finger of the right hand was wanting, and the left arm lame and incapable of extension. Portal has offered no explanation of the manner in which this adhesion between the placenta and fœtus was formed, and concludes the history with this observation: "L'on voit souvent des choses surprenantes dans les accouchemens, et on peut dire que la nature se joue dans la génération."*

In Mr. Pole's case of extraordinary malformation in a fœtus, the bones of the head, above the orbits, were almost entirely deficient. "The most extraordinary circumstance in this case," he observes, "is the attachment of the placenta to the upper part of the child's head, which was not by a mere membranous union, but of its more solid and compact parts. The largest portion of the placenta lay over the occiput and scapulæ, and extended considerably to the right and left side of the head; so that in viewing the child, as I have represented it in

* La Pratique des Accouchemens. Paris, 1685. p. 192.

the drawing, its internal surface only is seen, with the upper edge bent backward. This attachment of the placenta was principally towards the right side of the head."*

Mr. Carrs has related a case of monstrosity in which the bones of the cranium were wanting, and likewise the brain and medulla oblongata. A rigid membranous open pouch, coming from the scalp, hung down on the back. The orbitar processes, in that part which form the nasal, were perfect, and also the mastoid and zygomatic. The face was regularly shaped; but the eyes seemed to stand on the top of the forehead, from the failure of the cranium.

"A portion of the membranous part of the placenta was united to the scalp above the left eye; the funis was not more than three inches in length. There was no clavicula, scapulæ, humerus, or any arm on the left side. The dorsal vertebræ were much distorted. There was a deficiency of the peritoneal covering of the epigastric region of the abdomen. The liver and small intestines protruded from the cavity on the left side, and the large ones were distended with meconium. The right foot was inverted. The features, the extremities, and parts of generation, were large in proportion to the size of the monster. The mother could not attribute this malformation to any particular cause."†

Geoffroy St. Hilaire has given a representation of

* London Med. and Physical Journal, vol. iii. p. 397. 1800.

† Med. and Phy. Journal, vol. vii. p. 385. 1802.

the appearances observed in a case which occurred to Monsieur Duchateu, in which an aponeurotic membrane confined the head to the placenta. The placenta was attached to the back part of the left side of the head. The cord was twisted, and adherent to itself, near the placenta, similar to what was observed in the cord near the umbilicus in the case I have related.

The most remarkable band was stretched between the head and placenta. It occupied, on the left side, a considerable extent, as a prolongation of the dermis. This membrane was so strong, that it did not tear during the birth of the child. M. Geoffroy St. Hilaire has not offered any particular explanation of the manner in which these bands were formed.*

In a memoir presented by Monsieur Bonfils, of Nancy, to the Royal Academy of Medicine, a description is given of a female malformed fœtus, born about the fifth or sixth month of pregnancy, having the head very much inclined to the left, and an extensive adhesion existing between it and the placenta. The thoracic and abdominal viscera were malformed and displaced, and likewise united to the placenta by membranous bands. The following is the account given by Breschet of this case :—

The centre of the internal surface of the placenta was adherent to the whole of the left side of the cranium, and covered, likewise, the nose, left eye, and

* Anatomie Philosophie, tome ii. p. 151-203.

the half of the forehead of the same side. The amnion and chorion furnished loose bands, which extended to the left side of the neck, and anterior surface of the thorax. There was a fissure from the neck to the navel, along the anterior part of the trunk in the median line, which left uncovered the greater part of the organs of the chest and abdomen. The lungs, covered by the pleura, and the thymus, had preserved their natural form and relations; but the heart, which was unusually lengthened, had a transverse direction, with the base turned backward and to the right, and the apex turned upward, and to the left. The point of the heart had contracted attachments with the bands sent off from the placenta, and by these it was drawn out of the thorax upon the superior part of the anterior surface of the walls of this cavity, and intimately adhered to the anterior part of the head. It had formed, likewise, connexions with the liver, by a band stretching between these two organs. The pericardium, which was open in front, appeared to be in a great part wanting. The cranium had sunk down considerably, in consequence of the absence of the brain, so that the band which went to the cranial bones, though only an inch and some lines in breadth, embraced almost the whole of the left side of the head. It covered the sides of the nose, the left half of the forehead, eye, temple, and the whole of the left side of the head to the neck. It was further continued into the membranous folds on the left side of the neck, and descended along with them on the superior part

of the thorax. There these membranes became united to the placental extremity of the umbilical cord, which, about two inches and a half in length, proceeded also from the centre of the placenta under the bands, adhered to the left side of the trunk by other bands extremely short, and went to terminate at the umbilicus.

The soft parts of the face and cranium were so confounded with the placenta, and the bands were so short, that it was impossible to separate them without affecting one or other of the parts united together. At the neck and thorax, these bands were from eighteen to twenty lines in length, and allowed the placenta to be separated from the parts which it covered.

Mons. Breschet has referred all the appearances observed in this case to arrest of development, without explaining the precise manner in which this could have given rise to all the various malformations which existed in the different viscera.*

Mons. Lauray transmitted the details of another case to the Royal Academy, in which the placenta adhered to the scalp of the child, through a great extent of its surface. The head was flat at the anterior and superior part, where the os frontis and superciliary ridge were wanting, and the brain covered by integuments projected above the site of the right eye, which was also wanting. There was a double hare-lip. The child lived thirty-two hours,

* Repertoire d'Anatomie, tom. ii., P. I., p. 28.

and no attempt was made to separate the placenta from the head, to which it adhered over a great part of its surface. M. Lauray remarks, that this unnatural adherence took place, "sans qu'on peut soupçonner ni la cause ni la manière dont elle s'était établie."*

* Nouveau Bibliotheque Medicale, 1829.

ON THE

STRUCTURE,

PHYSIOLOGY, AND PATHOLOGY,

OF THE

PERSISTENT CAPSULAR INVESTMENTS AND PULP

OF THE

TOOTH.

By ALEXANDER NASMYTH, M.R.C.S.

READ JANUARY 22ND, 1839.

The teeth have been described as passing through three stages during their development and growth. These stages have been severally denominated the follicular, the saccular, and the eruptive. The nature of the follicular stage has been noticed and explained by Arnold, but has lately been more particularly investigated and described by my friend, Mr. Goodsir, in a very interesting paper published in the Edinburgh Medical and Surgical Journal for January 1839. The existence of this stage has however been disputed and denied by others. The saccular stage has long been well known, and its existence has never been called in question. In the present paper I shall confine myself more particularly to the nature of the third or eruptive stage.

The term, cutting of a tooth, has hitherto been employed to designate its protrusion through the capsule and the superimposed integuments. Respecting this process Cuvier thus expresses himself:—"Elle (la capsule) est percée à son sommet par l'evolution de la dent, mais ses bords s'attachent aux gencives, et en deviennent en quelque sorte la continuation."* This description of Cuvier has been, I believe, universally adopted; but my researches have led me to the conviction that it is erroneous, and that it is by a process of absorption, and not of disruption, that the tooth is emancipated.

The want of uniformity in the structure of the teeth, as described by anatomists generally, has long appeared to me to be inconsistent with the simplicity of the laws of nature. In the works of most authors on this subject we find it stated that, in the teeth of man, of the quadrumana, the carnivora, and indeed in simple teeth of all kinds, the enamel is protruded, and continues without any external covering whatever; whilst, in several other cases, there is described as existing on the same substance a dense coating of what is termed crusta petrosa. It struck me as remarkable that a texture so constituted as the enamel, should be in many cases exposed, divested of any tenacious covering, to the concussion of hard bodies, whilst in others it was provided with a dense, protecting investment; and the unaccountable nature of this diversity stimulated me to inquire into the subject.

* Des Dents des Mammifères, p. xxiv.

Some years ago, whilst engaged in some very minute anatomical investigations with my learned friend Mr. Bushell, I observed detached portions of membrane floating on the surface of the solution in which human teeth had been submitted to the action of acid. These were so delicate, and were separated with such facility, that it was some time before I could satisfy myself as to the part of the tooth to which they had appertained. After a minute and careful examination, however, I was able to demonstrate with the greatest certainty, that they were derived from the external surface of the enamel, and that they were continuous with the structure covering the fang, which latter is itself continued into the chamber of the tooth. I afterwards succeeded in tracing this covering on the whole surface of the enamel and fang of the tooth in one continuous envelope; and eventually I was enabled to remove it from the crown of the tooth in the form of a distinct coat or capsule. This covering, which I proved to exist externally to the enamel, I have termed "the persistent dental capsule."

The method of demonstrating the existence of this capsule is very simple. It is of course most likely to be found in a perfect state on the crowns of teeth which have been recently extruded; but on almost every tooth a remnant may be found which has not been destroyed by attrition. The teeth require merely to be macerated in muriatic acid, diluted to one-eighth of its ordinary strength, and, in the course of a few minutes generally, it will be

found to be loosened from the surface; and, as soon as it is once partially separated, it may easily be altogether detached. In all cases where this covering has been removed by means of acid, it has, of course, the appearance of a simple membrane, in consequence of the earthy deposits having been dissolved, and of there being only present the animal tissue. The structure and appearance of the covering, detached in this manner from the enamel, are the same in every respect as those observed in the capsule of the unextruded tooth; consisting, like it, of two layers, fibrous externally, and having on its internal surface, the peculiar reticulated appearance common to both, and shown at Plate V. fig. 6.

On first conducting these experiments I considered that the covering thus detached must necessarily be either a production of the capsule, or the entire capsule itself, or a part of it in a state of atrophy, ossified, and adhering to the enamel by means of the ossific matter deposited in it, or interposed between it and the enamel.

On examining carefully fine sections of several teeth under the microscope, I perceived here also that the structure in question was continuous with the crusta petrosa on the fang of the tooth. In the incisor of the ox, and in some other simple teeth, the characteristic ossific corpuscles of the crusta petrosa, as pointed out by Purkinje, are occasionally evident. (See Pl. V. figs. 4 and 5, at *a*, *a*, in each.)

Müller in his Physiology (one of the first text-books of the present day) states that the crusta pe-

trosa is a secretion from the saliva. His words are, "This new substance is the cement or crusta petrosa. It seems to be merely a deposit from the salts of the saliva, and to be essentially the same as what is called tartar on the human teeth." To prove the fallacy of this opinion, I have shown in Plate V. fig. 1, the microscopic appearance of the crusta petrosa of the elephant's grinder, where its organic nature, and the analogy in structure to bone is quite evident from the existence of the characteristic corpuscles of Purkinje, and the numerous ramifying canals in a state of ossification, and having a definite direction. I believe Müller is the only exception, however, to its being acknowledged on all hands that the crusta petrosa emanates in some way from the capsule. According to some authorities it is a direct product of the latter; whilst others state that the capsule is converted into the crusta petrosa, which, in this case, would be neither more nor less than the capsule in an ossified state. According to my investigations, therefore, the enamel of human and of all other teeth, simple as well as compound, is covered by a distinct capsular investment. This capsule in the compound teeth of some animals, as, for instance, those of the ruminantia, &c., has been long noticed under the name of cementum or crusta petrosa. The cementum always contains corpuscles or cells, the peculiar character of which is shown in several of the Plates. These corpuscles exist in the persistent enamel-capsule of the incisor of the ox, and some others; but I have not hitherto been able

to discover them in that of the human subject, and therefore, in the present stage of the investigation, I think we are only entitled to designate it capsular, and not range it under the general head of crusta petrosa: although it is directly continuous with it, and in all other respects analogous. However, whether it is to be included under the collective appellation of crusta petrosa or not, we have in it a very interesting example of the uniformity of the laws of nature, inasmuch as it would then be general throughout the animal kingdom. The considerations connected with this covering in the positive state of crusta petrosa are very interesting in many animals, where it has not yet been generally recognized, such as the Orycteropus, Bradypus, Rodentia, &c.

In pursuing this branch of the inquiry, I detected in the composition of the teeth another structure which I believe has never yet been noticed, and of which, if I mistake not, the consideration will be found to be of no little importance and interest. I allude to a layer of substance distinct in its appearance, situated externally to the crusta petrosa, where that is considerable. Its existence in the elk, ox, bradypus, dasypus, kangaroo, hippopotamus, elephant, &c., is shown by specimens in my possession. The appearance of it on the tooth of the Bradypus tridactylus is seen at *d*, Plate V. fig. 3. It varies in colour from pale yellow to dark brown, and is of a laminated structure. Its thickness is very various, and seems to have a certain ratio to the

thickness of the crusta petrosa. It may be possible that this investment is the cartilage of the crusta petrosa, but the darkness of the material has hitherto prevented me from observing any other peculiarity in its structure than that of the laminated appearance. The persistence of such attenuated textures as we see developed on the incisors of man and most other animals, as well as this ultimate investment of the crusta petrosa which I have just alluded to, must generally be of short duration on that part of the tooth which is subjected to attrition; and, as all will acknowledge also who have attempted to make microscopic sections of teeth, there is the greatest difficulty in preserving in their integrity the peripheral tissues of these organs; and the accidental fracture and destruction of the substances of which I have just treated is, doubtless, the cause of their existence having escaped the extensive and vigilant researches of Retzius, Purkinje, Fraenkel, and others. Hence too I should not be justified in asserting that the latter of the two structures which I have pointed out exists only in the animals above enumerated: for, as we arrive at still greater perfection in making sections of teeth, we shall probably find that it exists in many other cases where we have not yet been able to demonstrate it. It would be interesting to inquire into the relation which this tissue bears to the capsule, but I should not at present be warranted in pronouncing an opinion on this point, as my own investigations with regard to it are at present incomplete.

The appearance and structure of the ultimate peripheral investments of the teeth of all animals are very interesting, and present diversities in the respective groups which extend even to characteristic peculiarities. A consideration of these, however, would necessarily be far too extensive a subject to enter upon in a paper like the present. With regard also to the observations above detailed, there still remain many interesting points to be further elucidated and carried out; but I have been induced more from the advice of some friends, whose judgment I rely on, than by my own desire, to lay what I have done so far before the profession, without further delay. The views and observations which I here communicate have not, I believe, been, any of them, anticipated; but there is a remark made by Fraenkel in his inaugural dissertation published in 1835, which, in justice to that acute observer, ought to be recorded here as the only approach to anticipation which I have been able to discover. The passage I allude to is at sect. ix., and is as follows:— Speaking of the cortical substance, he says, "In the incisor of an old man of seventy-five we found the whole root surrounded with this substance, which at the extremity was very thick, and as it ascended thence, became thin by degrees, and extended onwards to that place, where the adamantine substance began; moreover, on one side, ascending higher up, it coated a small portion of the adamantine substance itself, and like a single layer could easily be removed."

I now proceed to the second section of my subject, viz., the consideration of that part of the capsule and capsular investment which is extended over the fang. The persistence of this portion of the capsule itself is manifest throughout the whole of the life of the tooth, from the circumstance that the crusta petrosa is produced during all periods of the existence of its vitality. There the capsular investment is generally limited to a thin crust, even in those animals where the crown is densely coated with cementum, so that in many cases an abrupt line marks the point where the enamel joins the fang. In the human tooth, however, the osseo-membranous covering is much thicker round the fang than round the enamel, and the portion which invests the former increases in size, in a ratio somewhat in proportion to the age of the individual.

The functions of the capsular membrane are of great importance at the period when the temporary teeth are removed to make room for the permanent series, inasmuch as it is the agent by which this removal is effected.

Where the temporary tooth has continued in a healthy state, and in vigorous vitality, its absorption proceeds with perfect regularity, and without causing any inconvenience, provided the new tooth is so situated as to exercise in its progress a regular pressure on the root of its predecessor. This pressure would seem to be necessary to the process of absorption, for we almost constantly find that the milk-teeth persist, where from irregularity in the arrange-

ment or growth of their permanent successors, it is not directly applied. In such cases, should the temporary tooth continue healthy, there seems to be no limit to its persistence; and I have seen instances in which it has remained in the perfect exercise of its functions till a very late period of life; the permanent tooth being then either altogether deficient, or remaining encased in the jaw; or forcing its way up laterally in the same row, as is shown in a model in my possession, where the under centre-incisor is seen retaining its position, and producing the apparent anomaly of the existence of five incisors in the human jaw.

Where the tooth is diseased, the capsule investing the fang is also affected, and is disabled from performing the function of absorption. In this case, the fangs of the temporary tooth only partially disappear, and generally maintain their position, notwithstanding the pressure which the growing tooth exerts upon them. Sometimes they remain so firmly wedged between their permanent successors, that it becomes a difficult matter to disengage them. The portion of the capsular membrane under consideration, seems to be the only agent capable of effecting the process of absorption; and we may have ocular demonstration of its performing this, by withdrawing carefully a deciduous tooth when it is near falling off. The fangs will then be found to have almost disappeared, and only a small portion of the membrane to remain; the latter is observed on the spot from which the tooth has been removed; it is in

connexion with the pulp, and the whole is highly vascular, and retains an exact impression of the surface of the tooth which was opposed to it. As absorption can only be carried on by the surface in immediate contact with the part absorbed, it follows, that this membrane must be so organized as to be able to effect that process. The fangs of the permanent teeth are subject to a similar action, being often absorbed, but in a very imperfect manner.

The normal exercise of the function of absorption by the capsular membrane may with facility be observed on the fangs of the temporary teeth of the lower animals; and also, to cite a curious instance, in the gradual loosening and separation of the anterior molars of the elephant, which are removed by its means. I have in my possession a tooth of the cachelot whale, furnishing an example of abnormal absorption. I have dwelt thus long on this process, because Retzius, and some of his followers, deny that it ever takes place, either normally or abnormally. The former thus expresses himself on the subject: "The crown of the advancing tooth appears to have pressed itself into the extremity of the deciduous one. I have carefully examined how this appearance is produced, and have come to the decided conclusion, that neither tabescence, absorption, or erosion takes place!" This opinion having been circulated and sanctioned by Müller and others, who advocate the tubular system of the teeth, I have thought it necessary to communicate the above details, which I think completely refute it. I am at issue, also,

on this point, with Cuvier and Rousseau, the latter of whom thus expresses himself on the removal of the milk-teeth: "Elles (les dents de la seconde dentition,) exercent sur ces alveoles une pression si forte qu'elles privent les dents de lait, en comprimant les nerfs et les vaisseaux qui s'y rendent, de la faculté de recevoir les fluides qui jusque-lá les avaient vivifiés." (Rousseau, p. 71.)

Where the milk-tooth is withdrawn, as above described, before the process of absorption is completed, the membrane remains behind; but the contrary takes place when it has invested the fang with a peculiar bony structure; in this case, it is generally found adhering to the adventitious matter, with which it comes away. This leads me to notice a formation which throws great light on the analogy between the functions of the different portions of the capsular membrane. I allude to the increment on the fang which is generally termed an exostosis, and which assumes all kinds of shapes, as may be seen from Plate VI. figs. 1, 3, and 6, at *a*, *a*, in each. The general texture of its internal structure, however, is uniform, as may be seen by the appearances shown in the longitudinal and transverse sections given in the above figures, and resembles true bone, though it has characteristic peculiarities, as may be seen from the highly magnified portion shown in fig. 5. The appellation, exostosis, as applied to a product of the ivory of the tooth, always seemed to me to imply a higher order of vitality in that substance than it actually possesses.

The morbid action producing this enlarged growth of cementum, or peculiar enlargement, generally called exostosis, may have a variety of causes, but it is generally induced by exposure to the atmosphere, or by the presence of some foreign body in contact with the internal membrane, when it has been denuded of its natural covering by ordinary decay. In this latter case, there is generally great pain referred to the tooth itself; but the jaw and surrounding parts often suffer to such an extent, that cerebral congestion, rheumatism, ear-ache, tic-douloureux, &c., are often supposed to exist, and the patient is submitted to the routine-treatment for these affections, without, of course, any permanent alleviation. Individuals of a sanguine, scrofulous diathesis, seem to be peculiarly liable to this form of disease, and females, I think, are more so than men.

Teeth which have lost their antagonists, frequently protrude from their sockets, and then the capsular membrane of the fang often throws out a considerable earthy growth, which, though it produces but little local pain, is attended with morbid symptoms, manifesting themselves in other parts. A similar growth often takes place when the teeth of adults have been forced out of their natural position, by oblique pressure from an antagonist tooth. I have known several instances where all the teeth, as far as I could ascertain, were thus affected. This growth occasionally renders them very difficult of extraction, for by enlarging the fangs, it, of course, causes them to be wedged more tightly in the socket. I am

not acquainted with any mode of arresting this malady, and have never known an instance where any other treatment except extirpation has been of the slightest avail. The existence of these bony growths may sometimes be detected, though never very easily, by a slight alteration in the colour of the tooth, and by its yielding a little more than natural in one direction, when steadily and forcibly pressed; in some cases the enlargement takes place in one fang more particularly, and then the tooth protrudes from the socket in an oblique direction.

On the necks of teeth notches are frequently seen, into which the nail or the point of a small instrument may be inserted, but not without causing a very acute sensation, derived, as it appears to me, from the vessels of the capsule covering the fang. Whether the absorption of the alveolar process, following the exhibition of mercury and other mineral medicines, be the work of the membrane under consideration, I have not been able to determine.

The absorption of the fang, and the deposition of osseous matter on its surface, are comparatively slow processes, from the gradual operation of their causes, but in cases of what is called alveolar abscess, disease is much more rapid, and its effects violent and sudden; here the fang is found dead and denuded of its membrane, which in a thickened state, at some distance from its surface, forms part of the suppurating sac.

When disease has once invaded this membrane to any extent, we may palliate it by other remedies,

but the only effectual cure is extirpation of the tooth, the true exciting cause. Where the teeth of the patient have suffered either from neglect or bad treatment, and present various stages of decay, the bone surrounding them is affected; a quantity of decomposed osseous matter is constantly being swallowed; the breath becomes horribly fœtid, and in an emaciated countenance, an enfeebled frame, and an irritable habit, we mark the effects of suffering the mouth to be converted into a charnel-house of diseased bone. The maladies which I have hitherto glanced at, may truly be considered as benign, when compared with others which must be regarded as their sequelæ, but which do not fall within the scope of the present paper.

There now remains to be considered the third section of our subject,—the pulp, which is a continuation of the capsular membrane.

The pulp seems to be a necessary agent in the construction of the teeth of the higher animals, and produces, as is well known, the substance called ivory, which is analogous in its general structure to the enamel. When the growth of the tooth is completed, the primary function of the pulp ceases; but in teeth of which the period of growth is unlimited, its action of course only terminates with their vitality. It occupies a small cavity in the interior of adult teeth of limited growth, and a conical cavity at the root of those of which the growth is unlimited. In the former case, one or more additional fangs may be formed by its subdivision into pro-

cesses, whilst in the latter the arrangement of the structures at the base of the tooth is the same as in its entire length. In some of the lower animals, being surrounded by the ivory which itself has secreted, it is normally converted into an earthy structure, the appearance of which is intermediate between ivory and bony substance. Examples of these appearances are given in Plate V. figs. 2 and 3, at *a*, *a*, in each; fig. 2 being a section of the tooth of the two-toed sloth, and fig. 3, that of the three-toed sloth. In man and other animals where the ossification of the pulp is the sequela of disease, the ap pearances presented possess many of the characteristics of true bone; but still is not generally so similar to it as is the ossific growth produced by the capsule of the fang, as will be seen on examination of Plate VI. figs. 1 *b*, 3 *b*, 7 *b*, and 4; fig. 4 being a more highly magnified view of a portion of fig. 3.

The substance under consideration, the nature of which has not hitherto been dwelt upon, partakes much of the fibrous character of the ivory, being composed of irregularly radiating filaments, blended with small calcigerous cells, in which ossified vessels are seen to ramify. The conversion into osseous matter is sometimes partial, and sometimes general throughout the membrane. In the longitudinal section, Plate VI. fig. 3, at *b*, the bony pulp completely fills up the cavity of the crown, and that in the fang. In the transverse section, fig. 7 at *b*, the cavity of the crown is only partially occupied; and in the longitudinal section, fig. 1 at *b*, the ossification seems to

have commenced in the centre of that portion of the membrane which is contained in the fang; and in this case a cavity has been formed round the ossified portion.

In the lower animals a similar ossification takes place when the functions of the part are interfered with; examples of which are often met with in the tusk of the elephant, hippopotamus, cystophera proboscidiana, and in the teeth of many other animals. The ossified pulp in the human subject is of frequent occurrence, and is generally, and indeed in every case where I have met with it, the sequela of long-continued disease, either of the tooth itself, or of some part of the mouth; though there is no direct evidence to prove that ossification of this structure may not take place without previous morbid symptoms. The predisposing cause, however, of the process is often at a considerable distance, and frequently shows itself when the actual or other cautery has been used to allay the sensibility without actual destruction of the internal membrane. Very frequently it supervenes on resistance to complaint, or on the determination on the part of the patient to retain a tooth which has given pain in stopping.

The process is always accompanied by pain, and by a peculiar uneasiness of the tooth itself, which is shared also by the surrounding parts. As it frequently takes place without any co-incident external decay, the only possible relief is often withheld, as there are no infallible diagnostic symptoms warrant-

ing a decided opinion; and the patient is left to suffer, till the malady having crept on to the external capsular membrane, affords to the careful observer a decided demonstration of its existence.

Disease manifests itself in various other forms in this membrane, which is endowed with no powers of repair. When completely denuded, it sometimes forms an acutely sensible fungus, and occasionally small white tumours are found in its substance, though the tooth is sound externally; but I have never met with these cases except in strumous habits, and in connection with considerable disease of the neighbouring parts.

With regard to the general subject of Dental Physiology, I hope that the sketch which I have given will serve to reconcile many conflicting opinions concerning the vitality of the teeth. The researches hitherto made allow us, I think, to attribute only a very low degree of vitality to the enamel and ivory of the teeth; for the phenomena which have generally been adduced in opposition to this doctrine, are, in fact, referrible not to the tooth itself, strictly speaking, but to different portions of the periosteal capsule.

I have shown above, that ivory, enamel, and cement, are not the sole constituent formations of the tooth; and I may here remark, that I am inclined to add another, which, though it has never been described, is, in my opinion, so frequently present, and so perfectly different from the other structures, in the mode of its formation, the nature of its func-

tion, and the appearance which it presents, as to merit the appellation of the fourth, distinct, constituent substance of the teeth,—I allude here to the osseous substance with which the pulp, in many animals, is normally converted, by interstitial deposition. Examples of these normal structures, as has been already mentioned, being given in Plate V. figs. 2 and 3, at *a*, *a*, in each. The simplest forms of teeth are almost exclusively composed of this substance, and in many of those which consist of cement and ivory, without enamel, it fills up the internal cavity. A clear definition and classification of the different substances which enter into the structure of the teeth, furnish, in my opinion, the only valid foundation for a scientific arrangement of the different modifications of these organs throughout the animal kingdom. This important subject, however, I hope to find an early opportunity of discussing, and shall, for the present, conclude, by expressing my belief that very much still remains to be accomplished before we can consider ourselves fully conversant with the structure of the teeth.

The points to which I wish at present particularly to call the attention of anatomists, are, first, the capsular investment on the surface of the enamel; secondly, the layer external to the crusta petrosa, already indicated in some animals; and, thirdly, the structure and development of the "fourth constituent substance," or ossified pulp.

ON

THE STRUCTURE

OF THE

CORPUS LUTEUM.

By ROBERT LEE, M.D., F.R.S.

READ JUNE 11TH, 1839.

The Graafian vesicle in the human ovarium is a small spherical pellucid sac, which contains a fluid, the ovum, and the granular substance in which it is imbedded. The vesicle itself always consists of two distinct coats or membranous layers, which adhere firmly together. The external surface of the Graafian vesicle adheres loosely to the stroma or proper substance of the ovarium, in which it is imbedded by soft cellular substance, blood-vessels, and nerves.

Soon after impregnation, the coats of the Graafian vesicle and the peritoneum covering it give way by absorption, the contents of the vesicle escape, and between its outer coat and the substance of the ovary, the corpus luteum is gradually formed.

The observations of De Graaf, Haller, and others, have proved that a corpus luteum is invariably formed after impregnation in the situation of the Graafian vesicle, from which the ovum had escaped; but whether the corpus luteum is produced by a thickening of the inner layer of the vesicle, or is an entirely new substance deposited between its coats, or around its external surface, and whether corpora lutea are not formed in the ovaria of some women who have never been pregnant, physiologists have hitherto been unable to determine.

Professor Baer is of opinion that the corpus luteum is formed in all animals by a thickening of the inner membrane of the Graafian vesicle. "De corporis lutei genesi satis dissentiunt observatores. Me judice minimè corpus novum est, sed stratum internum thecæ magis evolutum. Quod sequentibus observationibus demonstrari posse puto.*

Dr. Montgomery believes that the corpus luteum is formed between the coats of the Graafian vesicle, and does not consist, as Baer has supposed, of a thickening and puckering of the inner layer of the vesicle. "It will appear," he observes, "very obviously from the above description, that I believe the corpus luteum to be surrounded externally by the outer membrane of the Graafian vesicle, while its cavity is lined by the inner membrane of this vesicle; the corpus luteum being, in fact, enclosed

* C. E. Baer, De Ovi Mammalium et Hominis Genesi. Lipsiæ 1828, p. 20.

between these two membranes, and its substance pervaded by the small vessels passing from the outer to the inner. Of this I have reason to be satisfied, and I would not have deemed it necessary to insist on it, but that a different account is given on the high authority of Baer, who thinks that the corpus luteum is not a new body, but merely the inner coat of the Graafian vesicle in a state of greater development, which appears to be the opinion of Valentin also. Now the fact is, that it lies around and outside of the inner membrane of the vesicle, which is to be seen distinctly forming its central cavity at earlier periods, and by the collapse or approximation of its opposite surfaces, afterwards gives rise to the radiated white line which remains an essential distinctive character of the true corpus luteum at every subsequent period at which this body is still visible."*

On the 11th of July 1838, a woman, two months advanced in pregnancy, died of continued fever, in St. George's hospital. The uterus and its appendages were presented to me on the 12th, by Dr. Macleod, and the following is a short description of the left ovarium, which contained the corpus luteum. It was larger than the right ovarium, and had a considerable prominence on its convex edge, around which were seen ramifying a number of minute arteries and veins. There was a small circu-

* An Exposition of the Signs and Symptoms of Pregnancy, by W. F. Montgomery, M.D. London, 1837. p. 218.

lar depression at the point of this prominence, but a bristle could not be made to pass through it into the substance of the ovarium. On cutting open the ovarium, the corpus luteum presented itself of an oval shape and deep orange colour, with a small cyst in its centre, resembling the Graafian vesicle, with its coats thickened and contracted. With little difficulty I succeeded in separating one half of this cyst into two distinct layers, which appeared to be the two coats of the Graafian vesicle.

The outer surface of this cyst is so loosely attached by cellular tissue to the corpus luteum, that it can easily be separated from it. The corpus luteum itself varies from a line to a line and a quarter in thickness, and when examined with a magnifier, appears to consist entirely of small yellow globules or particles contained in cellular membrane.

Around the outer surface of the corpus luteum, and completely investing it, there is a white layer varying in thickness, the outer part of which loses itself in the substance of the ovarium, of which it appears to form a part, and to be similar in structure, having the mouths of divided vessels distinctly perceptible, as in other parts of the substance of the ovarium. The inner portion of this white layer, which appears to be condensed stroma, is separable on the one hand from the corpus luteum, and on the other from the substance of the ovarium, so as to give the appearance of a distinct membrane, considerably exceeding in thickness both layers of the

Graafian vesicle. Plate VII. fig. 1 exhibits the colour and form of the corpus luteum when first cut open, with the Graafian vesicle in its centre.

The Graafian vesicle is also enclosed within the corpus luteum, in a specimen of Fallopian tube conception of six or seven weeks, in my collection.

In another specimen of more advanced tubal conception, the Graafian vesicle is likewise seen enclosed within the corpus luteum.

The same fact is fully as evident in the preparation of the gravid uterus of ten weeks, in my paper on the membranes of the human ovum in the 17th volume of the Transactions of the Society; and in several of the preparations of the gravid uterus in the Hunterian Museum, the Graafian vesicle is also contained within the corpus luteum, and forms its central cavity.

From these observations on the corpus luteum soon after impregnation, we may conclude that it is neither produced by a thickening of the inner layer of the Graafian vesicle, nor by a deposit of a new substance between its two coats, but that it is formed around the outer surface of both these coats of the Graafian vesicle, and that the stroma of the ovarium is in immediate contact with the external surface of the yellow matter.

As gestation advances, the deep yellow colour of the corpus luteum fades, and the Graafian vesicle in its centre contracts and assumes a peculiar white membranous appearance, with small bands passing outward through the substance of the yellow matter,

like the radii of a circle. See the drawing of a corpus luteum seven months after conception. (Fig. 3.)

The corpus luteum has almost completely disappeared, and the ovarium returned to its natural size about three months after parturition. A small depression on the surface, and a slender white line running into the substance of the ovarium, are all the traces of the corpus luteum which remain in an ovarium three months after delivery.

In the ovaria of women who have never been pregnant, yellow oval-shaped bodies are frequently found, which it is difficult to distinguish from true corpora lutea.

In the greater number of spurious corpora lutea, as Dr. Montgomery has observed, the appearances are produced by blood extravasated within the Graafian vesicles, which assumes a fawn hue as the colouring matter disappears by absorption, and undergoes various changes, similar to those which are observed to take place in coagula of blood formed in the cavities of veins from inflammation of the coats or mechanical obstruction. After a longer or shorter period, the blood is entirely removed, and the coats of the vesicle contract, and often assume a brown, yellow, or black colour. In these false corpora lutea, the yellow matter is contained within the Graafian vesicle, and does not form around it, as true corpora lutea are always observed to do.

In advanced life a thickening of the layers of the Graafian vesicle not unfrequently gives rise to appearances resembling corpora lutea. These, and all

other false corpora lutea, are generally found deeply imbedded in the substance of the ovarium, or, if they are near the surface, they are not actually in contact with the peritoneum, but have a small portion of stroma intervening. If there is a cicatrix over these, it has an irregular form, very unlike the small circular aperture always seen in the peritoneum covering the true corpus luteum. Besides, in true corpora lutea there are always bands running from the outer surface of the central capsule to the stroma, surrounding the yellow substance of the corpus luteum.

In the ovaria of women who have died during menstruation, appearances have also been observed, which might easily have been mistaken for true corpora lutea.

On the 18th of November 1832 I examined the uterus and the ovaria of a young woman who had died suddenly the preceding day, when the catamenia were flowing. Both ovaria were larger than usual, and the Fallopian tubes were red and turgid. The peritoneal coat of the left ovarium was perforated at that extremity nearest the uterus by a small circular opening, around which the surface of the ovarium was elevated, and of a bright red colour. When cut into, the substance of the ovarium around had a fawn colour.

On the 14th of January 1837, a woman thirty-seven years of age, who had long suffered from hysteria, died suddenly in St. George's Hospital, during menstruation. No morbid appearance was

found to account for her death. A small circular aperture was observed in the peritoneum of the left ovarium, near the point where the corpus fimbriatum is fixed to the extremity of the ovarium. This opening communicated with a cavity in the substance of the ovarium, which was surrounded with a soft yellow substance, of an oval shape. The distinctive characters of the true corpus luteum were wanting.

From all the observations hitherto made upon the true corpus luteum, we may conclude that it is never formed but as a consequence of impregnation. The yellow oval-shaped substances found in the ovaria of women who have never been pregnant, are produced by morbid states of the Graafian vesicles, and are essentially different in structure.

P.S. On the 27th of July 1839, a lady, 29 years of age, died in the second month of her first pregnancy; and I inspected the body on the 29th, with Mr. Jorden of Lower Belgrave Street. The right ovarium contained the corpus luteum, from which there escaped about a small tea-spoonful of yellow serous fluid when it was cut open. On the 30th of July, I examined the ovarium and corpus luteum with Sir Astley Cooper and Mr. Wharton Jones, and the result is, that the correctness of the view which has been taken of the structure of the corpus luteum in this paper is now put wholly out of doubt. From the preparation of the part and the fac simile made of it by Mr. Jones, it is evident that no capsule surrounds the yellow matter, but that

the outer surface of the yellow matter is in immediate contact with the stroma, or proper tissue of the ovarium. It further clearly appears, that both the layers of the Graafian vesicle are within the yellow matter, that the innermost of these layers is smooth, and the outer layer rough and filamentous, and that processes are sent out from this exterior layer which penetrate the yellow matter to a considerable depth, and in some parts go quite through it to the stroma of the ovary. The peculiar convoluted appearance of the yellow matter is also distinctly seen. (See Pl. VII. fig. 2.)

April 19, 1839.
14, Golden Square.

EXPLANATION OF THE PLATES.

PLATE I.

REPRESENTS the upper portion of the heart and pericardium, the apex having been removed by a transverse section: malignant deposit is seen surrounding the heart, the reflected pericardium, with portions of the deposit, having been partly detached from its adhesions. The phrenic nerve of the right side is seen passing down on the reflected pericardium.

PLATE II.

Fig. 1.—Represents the appearance of the tumour of the tongue, in the case described at page 20.

a points to the situation of the ligature which encircled the right half of the tongue beyond the tumour.

b b the ligature which surrounded the diseased mass laterally.

c that which bounded it anteriorly.

Fig. 2.—A diagram serving to illustrate the situation and direction of the ligature; the letters correspond to those in fig. 1.

PLATE III.

Represents the patient affected with Dry Gangrene, described in Mr. Solly's paper at page 253.

PLATE IV.

Fig. 1.—*Dactylius aculeatus*, male and female, of the natural size.

Fig. 2.—Female worm magnified ten times, the internal structure displayed.

a head, with the orbicular mouth.

b caudal extremity, with the labiated anus.

c vulva.

d the three tubes by which the alimentary canal commences.

e alimentary canal.

f pulsating tube observed in the course of the alimentary canal.

g lobulated bodies surrounding the commencement of the alimentary canal.

h glandular bodies on the sides of the canal.

i moveable fimbriated bodies near the vulva.

k convoluted oviducts.

The spines are omitted in this figure.

Fig. 3.—Male worm magnified ten times.

a head.

b caudal extremity.

c sacculated alimentary canal.

d dark lines recognized about the junction of the anterior and middle third of the animal.

Fig. 4.—Lateral view of the tegument, showing a cluster of spines, and the radiated fibres by which they are moved.

Fig. 5.—A portion of the worm greatly magnified, exhibiting the arrangement of the spines.

Fig. 6.—Animalcule found in the urine, containing the *Dactylius*, highly magnified.

PLATE V.

Fig. 1.—A transverse section of the crusta petrosa of the elephant's grinder, showing the microscopic appearance of the bony corpuscules and ramifying vessels in an ossified state.

Fig. 2.—A longitudinal section of the tooth of the Bradypus didactylus.

a a the ossified pulp.

b b the ivory.

c c the crusta petrosa, on the surface of which there is a thin membrane visible, when viewed under a high magnifying power.

Fig. 3.—The highly magnified appearance of a transverse section of the tooth of the Bradypus tridactylus.

a a the ossified internal membrane.

b the ivory.

c the crusta petrosa.

d the membrane external to the crusta petrosa.

Fig. 4.—A longitudinal section of the incisor of the ox.

a a the capsular investment of the crown, external to the enamel, continuous with that on the fang, both having the characteristic corpuscles of crusta petrosa.

b b the enamel.

c c the ivory.

Fig. 5.—A highly magnified view of a portion of the same, including a portion of the crown and the fang. The same letters refer to the portions as in the above. The osseous corpuscles in the capsular investment are distinctly shown.

Fig. 6.—A highly magnified view of the reticulated appearance of the internal surface of the capsular investment of the enamel of the human tooth.

a cells filled with enamel.

b portion of the fibres of the fibrous layer.

PLATE VI.

Fig. 1.—A longitudinal section of a decayed human large grinder, where there is a large growth of crusta petrosa on the fang, at *a a*, and a partial ossification of the pulp at *b*.

Fig. 2.—A portion of a human tooth, where the appearance of the capsular investment of the enamel at *a a* is seen continuous with the same on the fang, and where no osseous corpuscles are seen.

Fig. 3.—A longitudinal section of a decayed human large grinder, where there is a total ossification of the pulp seen at *b*, and a large growth of crusta petrosa on the fang, as seen at *a*.

Fig. 4.—A highly magnified portion of the ossified internal membrane of Fig. 3.

Fig. 5.—A highly magnified portion of the crusta petrosa of Fig. 1.

Fig. 6.—A transverse section of the fangs of a diseased human large grinder of the upper jaw, where there is a considerable growth of crusta petrosa, as seen at *a a a*.

Fig. 7.—A transverse section of the neck of a diseased human large grinder, where the ossification of the pulp nearly fills up the chamber, as seen at *b*.

PLATE VII.

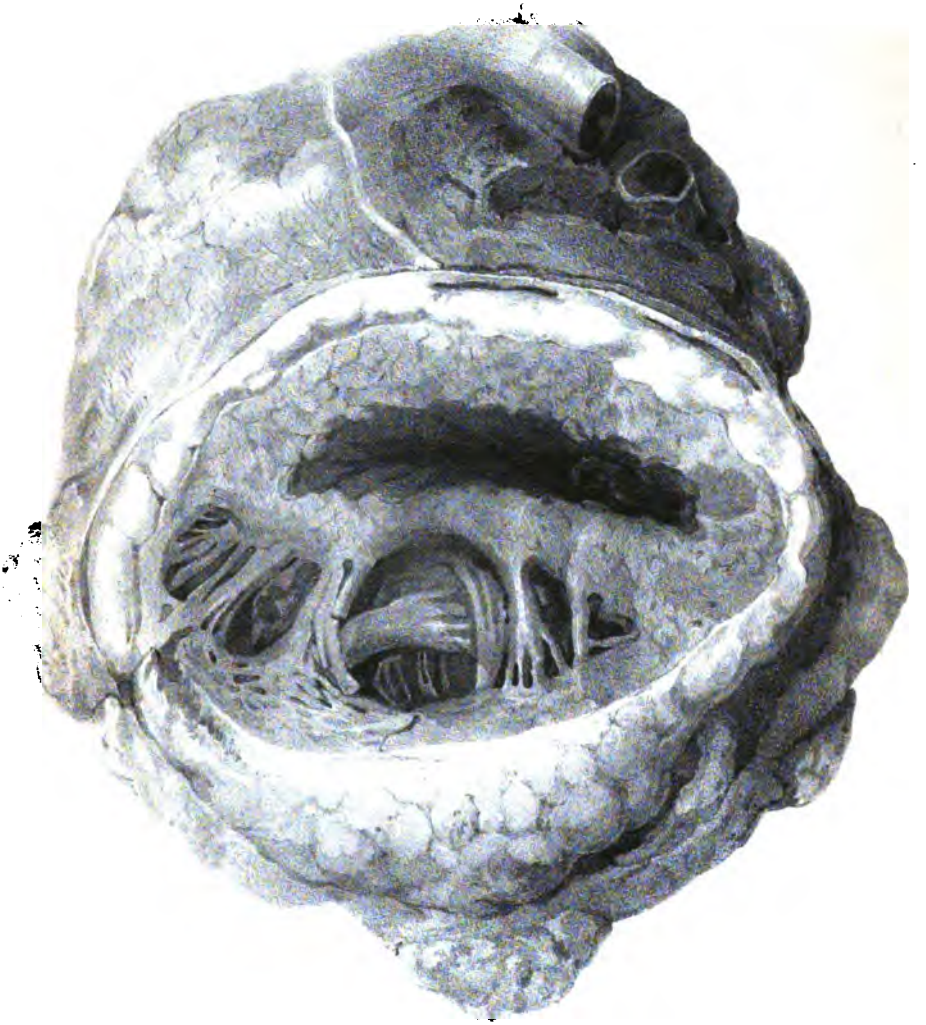
To illustrate Dr. Lee's paper on the Structure of the Corpus Luteum.

Fig. 1.—Shows the appearances presented by the corpus luteum at the end of the second

month of pregnancy; both layers of the Graafian vesicle are within the yellow matter, and on one side they have been separated to some distance from one another.

Fig. 2.—Exhibits the corpus luteum in the second month of pregnancy. The outer surface of the yellow matter is in immediate contact with the stroma of the ovarium. Both layers of the Graafian vesicle are surrounded by the yellow matter.

Fig. 3.—Represents the membranous appearance of the Graafian vesicle in the seventh month of pregnancy, with small white bands passing from the outer layer of the vesicle through the yellow matter.



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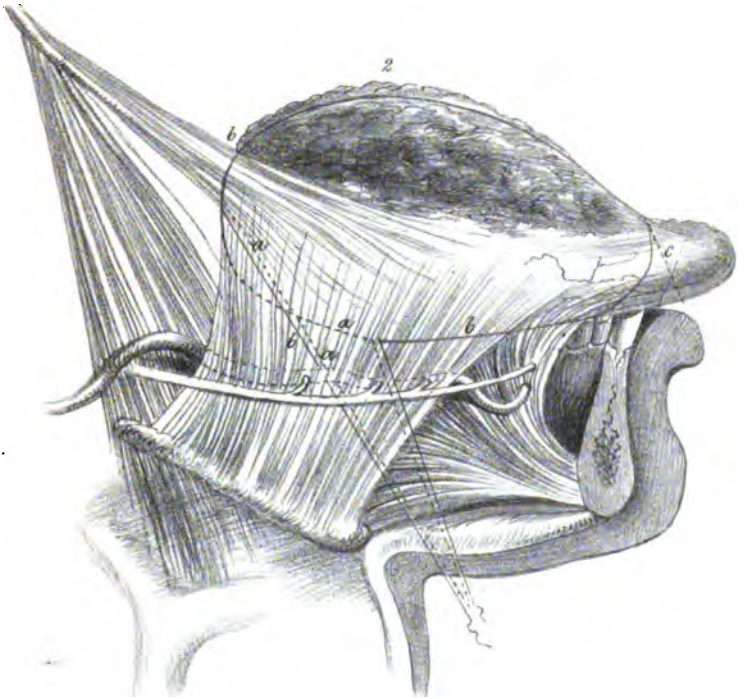

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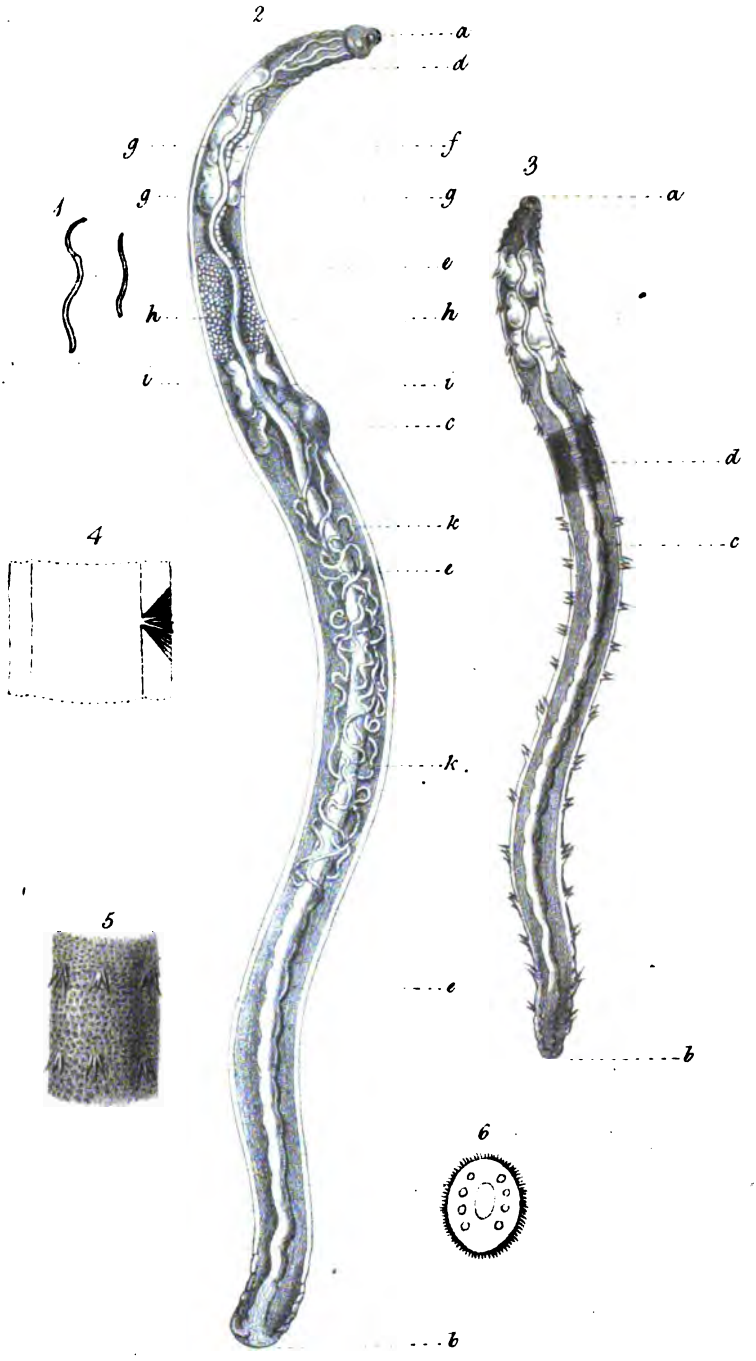

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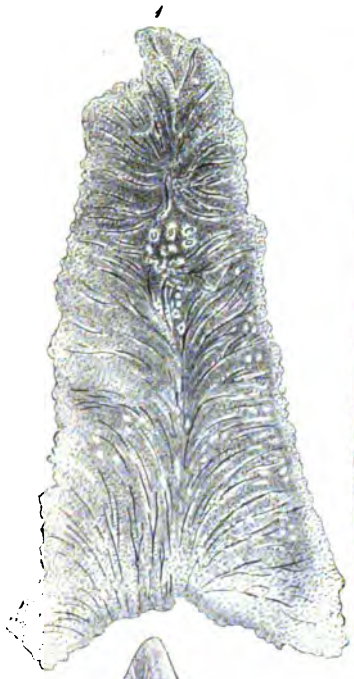

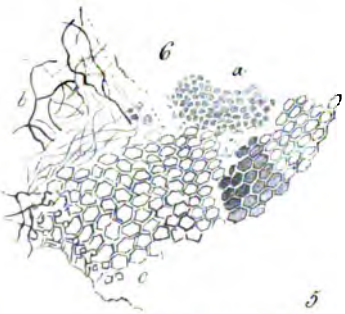

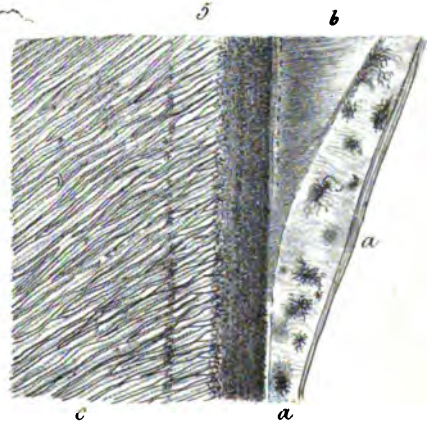

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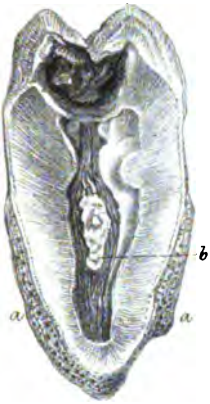

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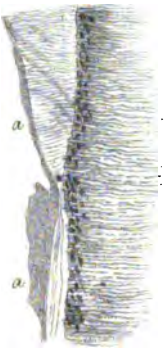

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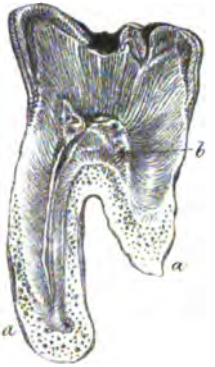

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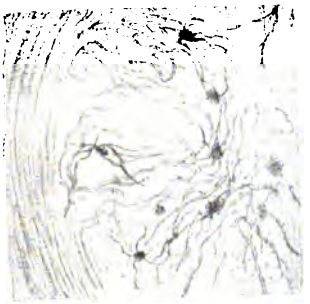

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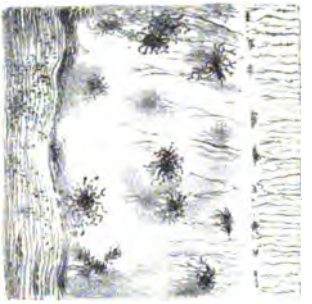

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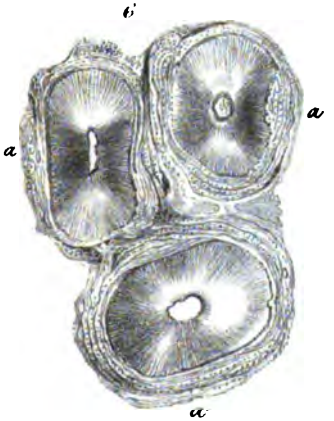

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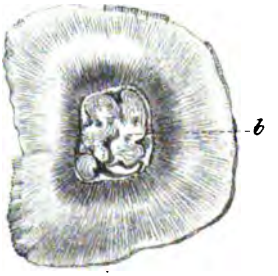

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